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THE AMERICAN ARCHITECT AND BUILDING NEWS

A WEEKLY JOURNAL OF CONSTRUCTIVE AND DECORATIVE ART.

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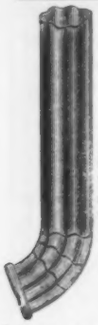

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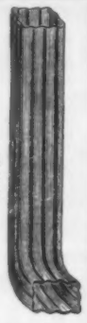

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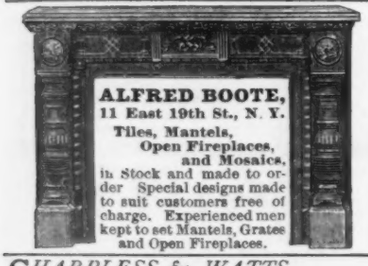

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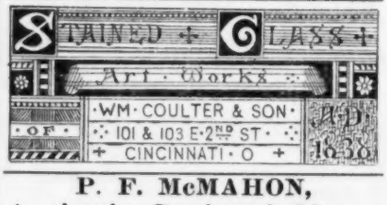

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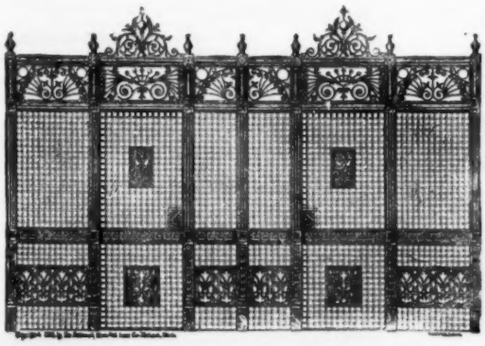

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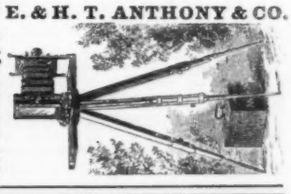

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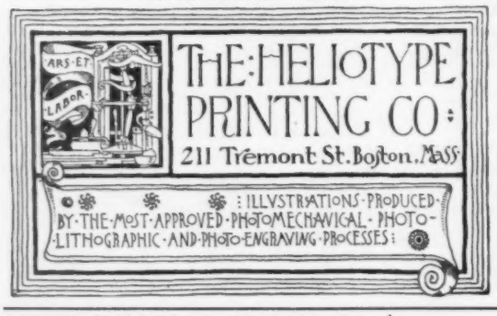

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Fronts:		19 00 @ 20 00	@ 27 00	Dark " @ 14 00
Croton, Brown	12 00 @ 14 00	Philadelphia		Pressed @ 24 00
" dark	12 00 @ 15 00	40 00 @ 45 00		Best Paving @ 15 00
" red	12 00 @ 15 00	Phila. mould		Second " @ 12 00
Chicago pressed		50 00 @ 80 00	22 00 @ 29 00	Third " @ 11 00
Chicago Moulded			65 00 @ 350 00	
Baltimore	37 00 @ 41 00		@ 50 00	
Glens Falls—white	30 00 @ 35 00	Glens Falls		
Philadelphia	24 00 @ 25 00	25 00 @ 26 00	@ 45 00	
Trenton	24 00 @ 25 00		38 00 @	
Milwaukee		Glens Falls	25 00 @	
Moulded:		Mould.	60 00 @ 100 00	
Clark's Glens Falls—Red	25 00 @ 27 00	30 00 @ 35 00	30 @	
" —White	30 00 @ 35 00	35 00 @ 40 00	35 @	
White " Mold,	45 00 @ 60 00	45 00 @ 60 00	55 00 @ 65 00	
Enamelled: *Imp.*				
Enamelled (edge.)	85 00 @ 100 00	@	@ 100 00	Dom. @ 65
Enamelled (edge and end)	90 00 @ 115 00	@	@ 120 00	Dom. @ 85
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Rosendale Cement	1 00 @ 1 10	@ 1 50	*Not Sold.*	1 15 @ 1 50
Louisville "			1 05 @ 1 30	Book, Shoobridge
Utica, Akron, Buffalo, Milw'kee.	*Not sold.*	*Not sold.*	1 00 @ 1 25	2 85 @ 3 25
Portland, English (Gibbs)	2 50 @ 3 10	@ 3 00	3 25 @ 3 40	2 85 @ 3 25
" " (K. B. & S.)	2 75 @ 3 10		3 25 @ 3 50	2 85 @ 3 25
" " (Burham)	2 50 @ 2 80		3 15 @ 3 35	2 85 @ 3 25
" " (White's)	2 65 @ 3 00			
" French (Lafarge)	3 50 @ 4 50	*Not sold.*	3 75 @ 4 25	Hemmoor
" German (Alsen)	2 75 @ 3 15	3 00 @ 3 50	3 25 @ 3 50	2 85 @ 3 25
" " (Fewer)	2 45 @ 2 70	3 15 @ 3 35	3 15 @ 3 35	2 65 @ 3 00
" " (Vorwohler)	2 50 @ 3 25		3 00 @ 3 25	Josson
" " (Lagerdofer)	2 25 @ 2 55	*Not sold.*	3 00 @ 3 25	2 65 @ 3 00
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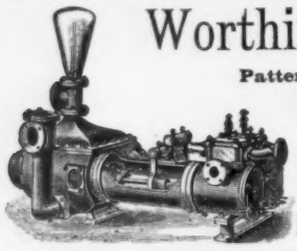
" " (Hanover)	2 50 @ 3 00		*Not Sold.*	2 85 @ 3 25
" American (Saylor's)	2 15 @ 2 30	2 15 @ 2 50	2 75 @ 3 00	2 50 @ 2 75
Roman	2 75 @ 3 00	@ 3 20	2 75 @ 3 25	3 00 @ 3 50
Keene's coarse	5 00 @ 6 50	@ 7 50	7 00 @ 7 50	6 50 @ 7 00
" superfine	8 75 @ 11 00	@ 11 50	11 00 @ 12 00	11 50 @ 12 00
Lime:				
Lime of Teil	@ 5 00		*Not sold.*	White Lime
Hydraulic Lime	@ 1 45	@ 1 45		28 @ 85 ₱ bush.
Chicago Lime in bulk			60 @ 65	White Mash
Wisconsin "			75 @ 85	1 25 @ 1 50
Rockland and Rockport, (Com.)	@ 1 00	@ 1 15	*Not sold.*	1 00 @ 1 00
Rockland and Rockport, finish	@ 1 20	@ 1 20	*Not sold.*	
State, com. cargo rates (nom.)	@ 90	*Not sold.*	*Not sold.*	*Not sold.*
State, finishing "	@ 1 10	*Not sold.*	*Not sold.*	*Not sold.*
Plaster of Paris (calcined.)	@ 1 25	1 65 @ 1 90	@ 1 75	1 25 @ 2 25
" (casting)	@ 1 45	@ 2 25	@ 1 75	1 75 @ 2 50
Hair (Cattle) ₱ *bush*	21 @ 25	@ 30	20 @ 25	22 @ 30
" (Goat)	30 @ 35	@ 30	35 @ 40	30 @ 35
Sand, ₱ *load*	1 00 @ 1 25	1 00 @ 1 75	100 @ 1 25	@ 1 50
STONE. (₱ *cubic foot, rough.*)				
Granite: (*Maine*)		@ 60		55 @ 65
Limestone:				
Bedford	@ 1 00	95 @ 1 00	50 @	80 @ 90
Joliet	@		35 @ 55	
Lemont	@		35 @ 60	
Serpentine	@		80 @ 90	4 50 ₱ Perch.

(Continued on page vi.)



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Foundation:				
Dimension	@	5 00 ℔ ton	20 @ 28	1 45 @ 2 50
Block	@	4 60 ℔ perch	8 50 ℔ cord.	Conshocken
Rubble	@	1 25 @ 1 50	8 50 @	1 45 @ 2 50
Bluestone: (℔ *sq. ft.*)				
Sidewalk	30 @ 5 00	40 @ 1 75	75 @ 1 00	1 in. th. 10 @ 19
Planed	50 @ 6 00	75	50 @ 1 00	37 @ 45
Sandstone,				
Longmeadow	@ 80	80 @ 90		1 05 @ 1 15
Kibbe	@ 90	90 @ 1 10		1 05 @ 1 35
Brown (Connecticut)	1 00 @	1 25 @ 1 45	1 50 ℔ cub. ft.	
Amherst } Ohio	90 @ 95	85 @ 95	55 @ 65	80 @ 1 00
Berea } Ohio	75 @ 1 00	80 @ 90	45 @ 55	
Berlin } Ohio	75 @ 1 00	80 @ 90	55 @ 65	
Belleville	80 @ 1 25	1 25 @ 1 35	"	1 10 @ 1 40
New Brunswick and Nova Scotia	@ 1 00	75 @ 90	"	1 00 @ 1 10
Caen	@	@ 2 00	"	1 15 @ 1 50
Marble (℔ *cu. ft.*)				
Lee, Mass.	@	1 75 @ 2 50	*Not sold.*	2 00 @ 2 50
Rutland, white	@	@ 3 00	3 50 @ 5 00	2 25 @ 2 50
Sutherland Falls	1 25 @ 1 75	@ 2 00	3 50 @ 5 00	1 70 @ 3 00
Glens Falls, black	@	2 00 @ 3 00	*Not sold.*	4 00 @ 4 50
Italian, blue-veined	@	50 @ 60	@ 4 40	2 50 @ 2 75
" Sienna	@	3 60 @ 3 50	*Not sold.*	@ 5 00
Tennessee, red	@	1 25 @ 2 50	@ 4 40	4 00 @ 6 00
" Knoxville	@	85 @ 90	@ 4 40	3 00 @ 4 00
Pennsylvania, blue	@		*Not sold.*	2 00 @ 3 00
Vermont, white	@	1 50 @ 2 00	3 50 @ 5 00	2 25 @ 3 00
Slate: Roofing (℔ *square*)				
" green	7 00 @ 8 00	4 50 @ 7 00	6 25 @ 8 10	5 00 @ 7 00
" " unfading	@ 5 75	@ 5 75		5 00 @ 7 00
" purple	7 00 @ 8 50	5 50 @ 6 50	@ 8 60	@ 11 00
" red	@ 15 00	13 00 @ 14 00	— @ 16 00	@ 11 00
" black, Lehigh	— @ —	Brownville, Me.	7 20 @ 7 60	@ 3 00
" " Chapmans	— @ —	6 50 @ 9 00	7 30 @ 8 00	@ 5 35
" Unfading Black, Monson, Me.	5 50 @ 8 00	5 50 @ 8 00	6 00 @ 8 50	@ 5 35
Tiles, Am. ℔ M	@		*Not sold.*	@ 27 00
N. Peach Bottom, warranted unfading				@ 7 00
PAINTS. (*In oil,* ℔ *lb.*)				
White lead, Am.	7 @ 7½	7 @ 7½	7 @ 7½	@ 7
" Zinc, "	5 @ 8½	@ 8	7 @ 10½	@ 7½
Red lead, Am.,	6 @ 6½	6 @ 6½	6½ @ 7	@ 7
" Venetian	6 @ 10½	7 @ 12	1½ @ 2½	dry Eng. @ 1½
" Vermilion	65 @ 70	55 @ 60 dry	55 @ 60	Eng. 18
Red Indian, Eng.	12 @ 20	12 @ 20	12 @ 20	@ 9
Yellow Ochre	6 @ 15	7 @ 12	3 @ 15	dry Am. @ 1½
" Chrome	12 @ 20	18 @ 25	15 @ 25	@ 20
Green (chrome)	8 @ 13	8 @ 20	10 @ 20	@ 20
Green, Paris,	25 @ 40	25 @ 40	18 @ 35	" @ 20
Black, lamp,	15 @ 25	15 @ 25	8 @ 30	@ 16
Blue, ultramarine	12 @ 18	18 @ 30	12 @ 35	@ 20
Oil, linseed, (raw) (℔ gal.)	43 @ 44	41 @ 42	42 @ 43	@ 45
" " boiled	45 @ 46	44 @ 46	45 @ 46	@ 48
Turpentine	40 @ 41	46 @ 50	@ 46	@ 40
Varnish, coach	@	1 50 @ 6 00	1 25 @ 2 00	@2 25
Shellac	@	2 50 @ 3 00	3 25 @ 4 00	@2 90
Putty	@ 3	2 @ 4	02 @ 02½	@ 2
Whiting (*dry*)	50 @ 65	1 @ 1½	1 @ 2	@ 1
Paris white, (Eng.,) (*dry*)	2 @ 3	2 @ 3	2 @ 2½	@ 1½
Litharge, Am. (*dry*)	5½ @ 5½	6½ @ 7	6¼ @ 6½	@ 7
Sienna (burnt)	12 @ 17½	14 @ 20	4 @ 16	@ 16
Umber, "	11 @ 16½	14 @ 20	2 @ 10	@ 14
HARDWARE.				
Nails: (*Per Cask.*)			3 50 @	per keg @ 2 90
Spikes, (*wrought.*)	@ 2 50		@ 2 40	@ 2 65
10d. common	@ 2 35	@ 2 40	@ 3 15	@ 3 15
Shingle	@ 3 00	@ 3 15	@ 5 50	@ 5 25
Lath	@ 4 55	@ 4 65	Add $3.00	per lb 11 @ 14
(*Finishing nails according to size.*)				Add 1 00 pr cask
(*For casing nails add 75c. per keg.*)				
Butts: 4" x 4" (℔ doz. pairs.)				
Plain	@ 1 00	@ 1 20	65 @ 1 00	@ 1 16
Japanned	@ 1 50	@ 1 75	*Not sold.*	1 75 @ 2 00
Acorn, Japanned	@ 1 50	@ 2 50	2 00 @ 3 75	1 75 @ 2 00
Acorn, Boston finish (℔ pair.)	@ 65	@ 75	*Not sold.*	@ 50
Bronze metal	@ 1 90	plain 2 25	2 00 @ 3 25	@ 1 37
Brass (for cupboards)	@ 10	@ 10	@ 12	@ 1 00
Ebony				℔ 35
Apple wood				37 @ 1 00
Knobs: (℔ *Set.*)				
Mineral, best	@ 8	@ 10	8 @ 10	@ 08
Lava	@ 50	@ 75	65 @ 80	*Not sold.*
Hemacite	*Not sold*	17 @ 38	31 @ 40	25 @ 50
Porcelain	@ 30	@ 12	25 @ 30	@ 30
Glass, solid	*Not sold*	@ 75	*Not sold.*	1 75 @ 2 00
Glass, silvered	*Not sold*	88 @ 1 50	@ 1 50	1 75 @ 2 00
Bronze metal	75 @ 2 00	88 @ 2 00	75 @ 2 50	50 @ 3 50
Brass	1 00 @ 2 50	88 @ 2 00	1 50 @ 3 00	50 @ 3 50
Solder:		16 00 @ 17 00	13 00 @ 15 %	22 ℔ 35
Iron:				
I-Beams up to 12"	@ 3	@ 3	@	
I-Beams above 12"	@ 3	@ 3	@ 4	30′ 2½ @2½
Channel-Beams up to 12"	@ 3	@ 3	@ 4	

(*Continued on page* vii.)

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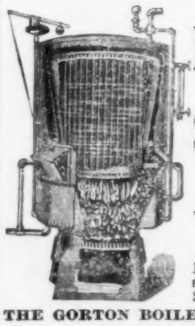

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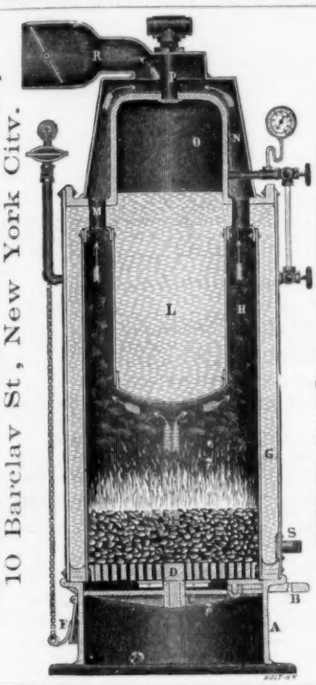

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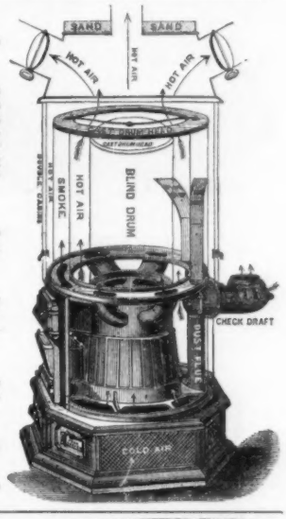

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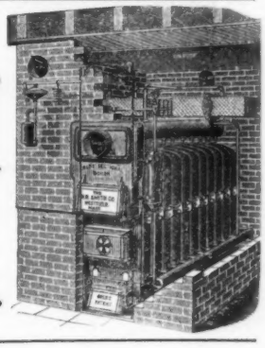

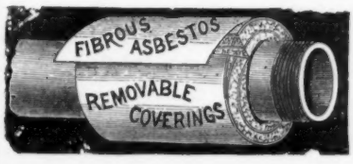

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Pine, 1st quality, clear	65 00 @ 75 00	50 00 @ 60 00	46 00 @ 48 00	55 00 @ 60 00
" 2d quality	55 00 @ 60 00	42 00 @ 48 00	44 00 @ 46 00	40 00 @ 50 50
" 3d quality	18 00 @ 22 00	35 00 @ 40 00	43 00 @ 45 00	15 00 @ 30 00
Spruce	@ 25 00	13 00 @ 15 00	*Not sold.*	@ 35 00
Hemlock	ea. 17 @ 18	12 00 @ 13 00	@ 10 00	@ 14 00
Yellow pine	20 @ 40	25 00 @ 40 00	@ 28 00	20 00 @ 50 00
Cypress	@	32 00 @ 40 00	@	40 00 @ 45 00
Clapboards:				
Pine	@	33 00 @ 55 00	10 50 @ 22 00	20 00 @ 35 00
Spruce	@	23 00 @ 35 00	*Not sold.*	*Not Sold.*
Framing Timber:				
Pine			12 00 @ 17 00	28 00 @ 32 50
Spruce	13 50 @ 16 00	13 50 @ 16 00	*Not sold.*	20 00 @ 22 50
Hemlock	12 00 @ 15 00	@	10 50 @ 15 50	12 50 @ 13 50
Yellow pine	18 00 @ 25 00	23 00 @ 30 00		26 00 @ 28 00
Laths:				
Pine	1 00 @ 2 20	2 25 @ 2 35	1 75 @	@ 3 00
Spruce	@	2 25 @ 2 50	*Not sold.*	@ 2 75
Shingles:				
Pine, shaved ℔ M	5 00 @ 6 00	@	*Not sold.*	
Pine, sawed "	4 00 @ 5 00	@ 4 50	2 40 @ 2 60	
Spruce, sawed "	1 50 @ 2 00	1 50 @ 2 00	*Not sold.*	
Redwood ℔ 125	1 40 @ 1 60	3 75 @ 4 50	5 50 @ 8 00	30" $10 @ 28 / 24" 8 @ 21
Cedar, split ℔ M	@	@	*Not sold.*	20" 5 50 @ 14
Cedar, sawed "	@	2 00 @ 4 00	2 25 @ 2 35	13 00 @ 20 00
Cypress. Split....7 x 24. "	18 00 @ 20 00	5 50 @ 6 00	4 00 @ 4 50	
Miscellaneous:				
Piles ℔ ft.	4½ @ 5½	Piles 6c. ℔ ft.	*Not sold.*	
Fence pickets, Spruce	8 00 @ 10 00	10 00 @ 18 00	Pine, 8 @ 21 00	12 00 @ 14 00
Cedar posts, 9 ft. (sq. posts.)	@	25 @ 35	9 00 @ 21 00	70 @ 1 25
Chestnut "	@	25 @ 35	*Not sold.*	28 @ 36
Finishing Woods: ℔ M. (*First Qual. Kiln-dried.*)				
Ash	@ 55 00	38 00 @ 50 00	35 00 @ 40 00	35 00 @ 50 00
Cherry	80 00 @ 120 00	60 00 @ 100 00	80 00 @ 100 00	75 00 @ 120 00
Chestnut	@ 55 00	38 00 @ 50 00	45 00 @ 50 00	40 00 @ 50 00
Butternut	40 00 @ 60 00	60 00 @ 70 00	50 00 @ 60 00	67 50 @ 75 00
Mahogany, Baywood [Mexican]	@ 180 00	150 00 @ 160 00	150 00 @ 180 00	150 00 @ 250 00
" St. Domingo	@ 350 00	120 00 @ 350 00	250 00 @ 300 00	200 00 @ 300 00
Maple	45 00 @ 50 00	45 00 @ 60 00	30 00 @ 35 00	27 50 @ 55 00
Oak, red	@ 70 00	@ 50 00	35 00 @ 40 00	35 00 @ 45 00
" white	@ 70 00	50 00 @ 55 00	35 00 @ 40 00	40 50 @ 50 00
" quartered	@ 90 00	65 00 @ 70 00	45 00 @ 50 00	57 50 @ 67 50
Sycamore quartered		50 00 @ 65 00	40 00 @ 50 00	57 50 @ 67 50
Pine, clear	65 00 @ 70 00	30 00 @ 65 00	45 00 @ 50 00	@ 65 00
Redwood	60 00 @ 70 00	60 00 @ 70 00	56 00 @ 65 00	72 50 @ 75 00
Rosewood ℔ lb	@ 6		@ 7	
Walnut, black	125 00 @ 150 00	85 00 @ 120 00	80 00 @ 100 00	90 00 @ 200 00
Whitewood	45 00 @ 50 00	38 00 @ 45 00	30 00 @ 35 00	25 00 @ 45 00
Yellow pine ℔ M	@ 45 00	40 00 @ 45 00	30 00 @ 35 00	37 50 @ 45 00
Gumwood, best red			30 00 @ 35 00	

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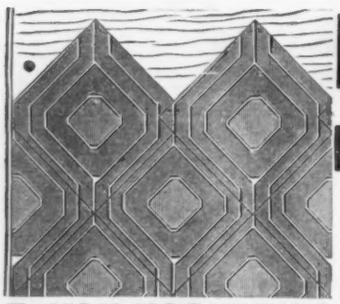

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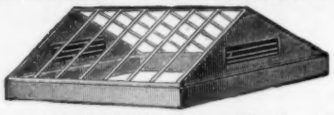

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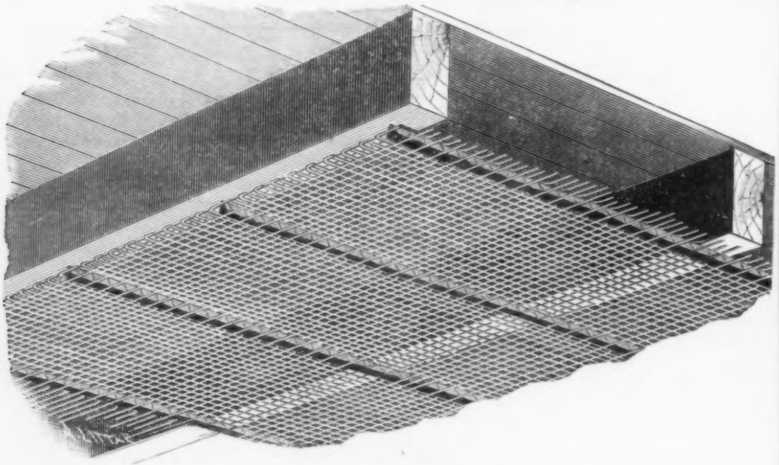

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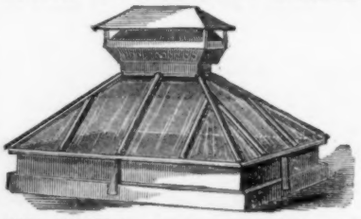

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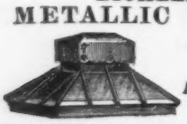

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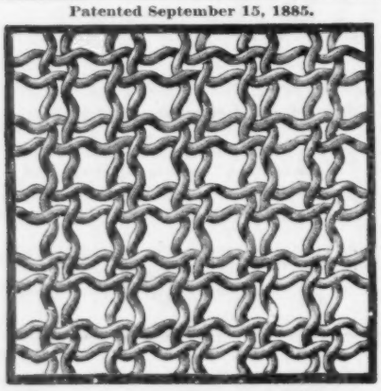
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See Page xiii., Why Gilbertson's Old Method Roofing Plates were accepted for Roof of White House at Washington.

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We then, to the best of our ability, tested the coating, and found the OLD METHOD much more heavily coated than any of the others, Old Style having the least coating. OLD METHOD was the smoothest, free from spots, and with cleaner edges, Old Style coming next.

As to the quality — *i. e.*, ductility, etc. — we could not distinguish any difference, but in every other particular OLD METHOD is better than any of the others named, and we have decided for our use OLD METHOD must have the preference.

We thought may be you would be glad to hear that your OLD METHOD compared so favorably with the other leading brands; hence, this letter.

[Signed] Respectfully, OBY & LOVE.

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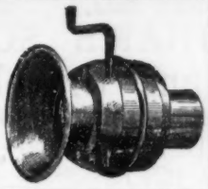

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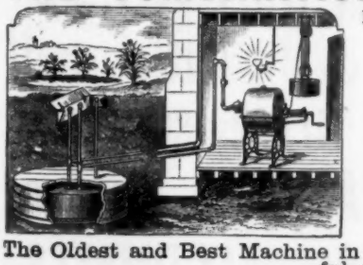

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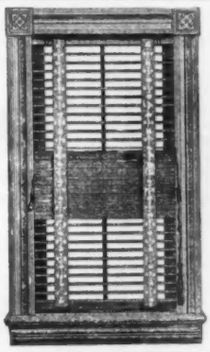

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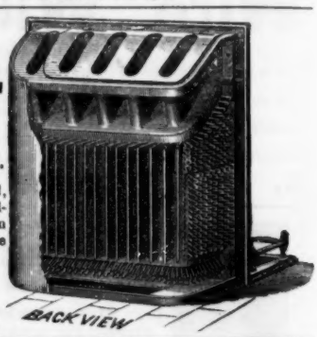

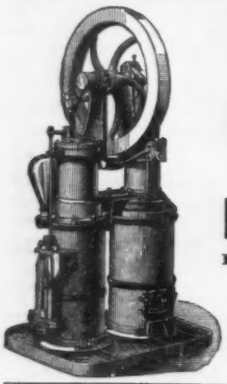

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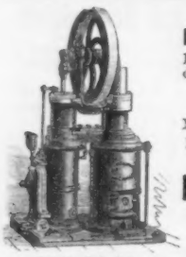

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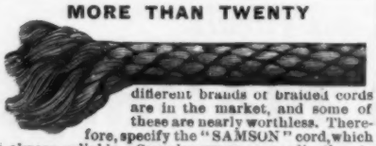

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THE AMERICAN ARCHITECT AND BUILDING NEWS.

VOL. XIX. Copyright, 1886, TICKNOR & COMPANY, Boston, Mass. No. 539.

APRIL 24, 1886.

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THE Boston Fire Underwriters' Union has been taken with the excellent idea of sending to the various architects in the city a set of circulars containing the various regulations which it has seen fit to adopt in regard to the rating of buildings of different types of construction. The circulars bear the marks of having been hastily prepared, and are sent out on loose sheets of different sizes, so that it will be much less convenient to preserve and use them than if they formed a pamphlet, but it is well that a beginning should be made, and we hope that it will not be long before every architect and owner will be found consulting the insurance rate-book as a preliminary to building operations quite as important as a reference to the statute regulations. As we have often remarked, the influence which underwriters could, if they chose, exercise over the arts of construction in cities is practically unlimited. Against the vigilance of the State inspectors there are only too many ways of providing, and the penalties of the law are, at best, only incurred by flagrant violations of prudent construction, while the underwriters' tariff is, or ought to be, always present with the gentle but irresistible persuasion which attaches, in the business mind, to the offer of five per cent discount in rates here, and ten per cent there, for the adoption of improvements on the cost of which a saving of one-tenth or one-twentieth of the insurance premiums represents a large interest. Fortunately for the community, it seems to be getting unfashionable among insurance managers to affect to despise details of construction, and to exult over large fires as being "good for the trade." Perhaps some of the stockholders who help to pay the losses, without the consolation of drawing the salaries, have been reflecting upon their side of the question; and if their example should be followed by others, we may expect to see in New York and Boston, perhaps in advance of the rest of the world, a most needed change in the attitude of the insurance companies, which are charged in England and France, even more vehemently than here, with having directly encouraged that degradation of the art of building which is now costing the world such enormous sums every year.

THE Boston rules, well intended as they are, seem to us open to so much criticism that we hope we shall be considered only as wishing to help along the good work if we make a few remarks about them. The circular relating to Mills, Factories, Stores, Warehouses, and other buildings used for similar purposes, for instance, begins by saying that the walls must not "exceed sixty feet from the sidewalk." No exception is made to this singular limitation, which would exclude from the insurer's grace nearly all stores more than four stories high, without regard to provisions in the way of sprinklers which might make eight stories just as safe as four. The third and fifth clauses, again, require all floors and roofs to be "made of heavy timbers and planking, without plastering or sheathing." Why sheathing on the underside of the planking, which would be the only practicable plan with the girder construction, should be objected to we cannot imagine, and it is still less easy to understand why plastering on wire lath, or even on wooden lath laid upon the underside of the planks, should be forbidden. As every architect knows, the most serious obstacle in the minds of owners to the adoption of the "mill" or "slow-burning" construction in the better class of mercantile buildings is the fear of their rough look, and the consequence of prohibiting the use of a neat finish of sheathing or plaster, which can hardly ever be objectionable, and may be made extremely advantageous to the fire-resisting character of the building, will simply be to drive a large class of proprietors, who look with well-founded disgust upon the yawning seams and stains and season-cracks of a plain mill ceiling, back to the old methods of construction.

THE rules about floors, again, demand that the girders shall be made of "heavy Southern pine timbers," "covered with three-inch tongued and grooved plank," and "two layers of asbestos or other heavy floor-paper," saying, however, that "in stores and warehouses an inch of lime mortar can be used instead" of the paper. Nearly every sentence of this, considered as a practical direction for a certain detail of building, is open to question, if nothing more. There is no reason why spruce timbers, well selected and seasoned, should not be used instead of Southern pine. With dimensions proportionate to their slightly inferior strength they are just as good for the purpose as the far more costly Southern timber, and are free from the vermin which large pieces of Southern pine sometimes bring into buildings. The requirement that the flooring plank should be "tongued and grooved" expressly excludes the double-grooved and splined planks which are used in nine-tenths of the "slow-burning" buildings, and which are in every way better and more economical than the sort demanded by the Boston rules. The paper over the plank may be of some use in stopping currents of air, although we have yet to be convinced that a material so incoherent as most asbestos paper, or many kinds of cheap flooring-felts, would have any great value in checking a conflagration, but the inch of lime mortar which the rule allows to be used "instead of paper" would be very injurious if employed in the way specified. Where the ceilings beneath are plastered, deafening of lime-mortar may be placed on the under flooring with safety, though even then it is better to lay paper under the mortar, and to paste another layer of paper over it, to prevent the dust of its disintegration from rising through the upper flooring; but with nothing beneath it except wide matched planks, and a thin floor above, traversed constantly in every direction by heavy trucks, there would soon be a shower of lime-dust from the ceiling of such rooms which would be destructive to goods or machinery. Probably no builder in his senses would put mortar deafening in such a floor without paper under it, but this does not make it less desirable that the official rule of the Underwriters' Union should be more carefully considered. There are other points that demand attention, but for the present we must content ourselves with expressing our amazement at another rule which informs us that in "mills, factories, stores and warehouses" "iron girders and columns are not allowed." We suppose that this must be intended to refer only to the interior of buildings, for the Statutes of Massachusetts forbid the use of timber, even "the best Southern pine," under walls; but, to say nothing of the ease with which iron beams and columns may be protected against fire by the use of wire cloth and plaster, the use of wooden posts in the lower stories of warehouses is often impracticable. To illustrate this by an example, a five-story warehouse, calculated, as such buildings usually should be, for a load of at least two hundred and fifty pounds to the square foot, exclusive of the weight of the floor, and equipped with columns, as required, of the "best Southern pine," would need to have the basement columns, if they were twelve inches in diameter, twenty-eight inches apart in the clear, supposing the cross beams to be twenty-two feet long to the centre of the girder; and, as the columns above must necessarily be placed over those below, the same crowding would

be required in at least two stories above, while in the case of a metal store, or a flour warehouse, where a load of five hundred pounds to the square foot is often placed on the floors, the spacing must be still closer. It is obvious that no owner would choke up his building in this way, and the use of iron columns and girders ought to be looked upon as a necessity, the dangers of which, from the insurers' point of view, may be wholly obviated by means known to all architects, and to most builders.

WE are glad to learn that the bill providing for the purchase of a site for the Congressional Library, and for beginning the erection of the building, has passed the House of Representatives by a large vote, and the Senate by a unanimous vote, so that there is little doubt that the matter is now practically decided, and that construction will commence at an early day. Most of our readers are already familiar with Mr. Smithmeyer's carefully-studied plans, and many have perhaps seen the modified elevations, which show a building of unusual interest and dignity, quite in keeping, as to style, with the noble front of the Capitol, opposite which it will probably stand. As has often been remarked by the distinguished Librarian of Congress, Mr. A. R. Spofford, the Congressional Library differs in some respects from any other in the world, and requires a building exactly suited to its peculiar needs. To say nothing of the enormous copyright and trademark business which the law imposes on it, the Library is in itself one of the principal objects of interest in Washington, and it is less necessary to provide for the accommodation of students and readers than for the convenient reception of thousands of visitors, who care nothing for the books or their contents, but must, in accordance with the courteous traditions of American administration, be conducted through rooms so arranged that they may gain an idea of the resources and work of the place, without coming so closely in contact with either as to interfere with the higher uses of the great library. The plan now fixed upon is the result of many years of labor and study on the part of Mr. Smithmeyer, who has, we believe, made two journeys to Europe, solely to inspect the newer library buildings there, and has been efficiently aided during the last few years by Mr. Spofford's knowledge of the special needs of our own great collection, so that we may reasonably expect the future structure to be one of the few public buildings in this country perfectly adapted from the first to the service which it shelters.

A CONVENTION is to be held in Philadelphia, commencing on Wednesday, May 12, and continuing three days, under the auspices of the State Board of Health of Pennsylvania, for the purpose of discussing matters relating to "the prevention of sickness and avoidable death, and the improvement of the conditions of living." All persons interested are invited to be present and take part in the proceedings, and a very interesting list of subjects is announced for discussion. Among those which particularly concern the profession of architecture are three, relating to the Sanitary Needs of School Buildings and Grounds, Mistakes in School Architecture, and Defective Vision in School Children, with its Causes and Management; together with one on Ventilation, one on the Hygieue of the Home, and one on Drainage and Sewerage in Country Districts." On all these subjects many architects can offer suggestions of great value, and we hope that all who are able to do so will avail themselves of the opportunity to exchange views with others, and either to contribute from their experience or to learn from that of others, in regard to matters of such peculiar importance to those who are entrusted with the arrangement and construction of the buildings in which their fellow-citizens must pass their lives. If any of our readers wish for further information in regard to the convention, they should address Dr. Joseph F. Edwards, the Chairman of the Committee of Arrangements, 224 South Sixteenth Street, Philadelphia.

MR. EDWARD S. PHILBRICK calls attention in the *Sanitary Engineer* to some of the dangers of carrying ventilation-pipes from rooms of dwelling-houses into the smoke-flues of chimneys. Every one knows that it is common to ventilate rooms by means of tin pipes running from an opening in the ceiling, over the centre chandelier, between the beams of the floor above to some neighboring heated flue, and most architects probably think that this practice is unobjectionable, but Mr. Philbrick tells a story of a case in Boston, where a pipe of this kind had been carried from the perforated centre-piece over a chandelier into the flue from an open fireplace. One day a servant threw into the fireplace a quantity of old and dry Christmas evergreens. The dry, resinous twigs and leaves blazed up, setting fire to the soot in the flue, and the flame issuing from the top of the chimney soon brought the city firemen to the house. While the men were waiting to see whether the flue would burn itself out harmlessly, flames were seen to issue from the perforations in the centre-piece over the chandelier, and the firemen, guessing the cause, cut holes with their axes through the floor above, and soon found the tin ventilation-pipe red-hot, in contact with the floor-beams, to which it had set fire.

A RATHER important question of employer's liability was discussed recently in *La Semaine des Constructeurs*. One of its correspondents is a contractor, who owns stone quarries and works them. All his quarrymen work by the piece, and are insured against accidents, in the admirable way now becoming common, by deducting the premiums from their pay. Occasionally one of the quarrymen will bring a laborer or apprentice to help him in his work, paying him out of his own pocket, and no objection is made to this by the proprietor of the quarry, although, as his contract with the accident insurance company expressly stipulates that it shall apply only to men whose names are on his pay-rolls, the strangers are necessarily unprotected in this respect. Not long ago one of the quarrymen hired a laborer to help him along with his job. In some way this laborer was injured while at work, and forthwith laid claim to indemnity from the accident insurance company under the general policy of the proprietor of the quarry. The contract of the latter with the insurance company unquestionably excluded the laborer's claim, and he then brought suit for compensation against the quarry-owner himself, who wrote to *La Semaine* to ask whether he was liable to a man not employed or paid by him, and present in the quarry without his knowledge or authority. It is worth noting by all contractors that the reply of the legal adviser of *La Semaine* is unfavorable to the quarry-owner. Although his men work for him by the job, instead of by the day, they are still, according to a decision of the Court of Aix in 1865, his agents, and not independent contractors in a way which would relieve him of responsibility for their actions. According to the decree of the Courts, a man who works by the job, or piece, is subject to the supervision and direction of the master or foreman in much the same way as one who works by the day, and being thus at all times under the control of his employer, and liable to dismissal at any moment, he must be considered as a servant, for whose acts his master is accountable. The accident by which the laborer in this case was injured seems to have been due to the carelessness of the workman who hired him, and *La Semaine* considers that the laborer has for this reason a right to demand compensation either from the workman, or from the master who is legally answerable for the workman's neglect. If the master is obliged to pay the indemnity, he has a right to collect it if he can, from the workman who committed the fault, but he can get no help from his contract with the insurance company, by which the company assumes all liability for accidents to his employés, for the policy excludes persons not named in his pay-rolls, and he is not entitled to plead the stipulation of the company in regard to his liability against a person who was not a party to this agreement.

THE *British Architect* gives an account of an interesting test of wrought-iron girders protected by wire lath and plaster, which was made by Mr. Alfred Tozer, the superintendent of the Manchester Fire-Brigade. The wire lath employed was a sort with hexagonal meshes, very inferior, we should say, to the improved kinds in use in this country. A hut was built, apparently with walls of woodwork, covered on the inside with wire lathing and plaster, and the roof, which was loaded with weights, was supported by two iron beams, one of which was left bare, while the other had wire netting wrapped around it in the simplest way, and plastered, and the ceiling was similarly protected. A fire was kindled in the room and allowed to burn for forty-three minutes. At the end of that time the unprotected iron girder had given way completely, but the plastered portion of the building was quite uninjured, the only visible damage being the scaling off of a small portion of the skim coat of the plastering.

MURAL PAINTING.[1] — X.

OIL PAINTING.

A Titian.

OIL painting is too well known and widely practised to call for any technical description. The object of these papers has been to consider the appropriateness of the different processes to mural painting, rather than to describe their technics. If unfamiliarity with some of them has necessitated a detailed technical exposition, it has been made with a view to estimate their decorative possibilities. From divers allusions dropped here and there in the preceding papers it must have been inferred that oil is not a suitable vehicle for mural paintings. In order to understand why not, it will be necessary to make a few trite chemical statements.

Oil is composed of an oil acid linked with glycerine ether; from it both glycerine and soap can be made.

Soap is a compound of an oil acid linked with alkalies or oxides, as potash, soda, lead, zinc, iron, lime, etc. In making, the glycerine ether of the oil, with which the alkali or oxide is mixed, is set free. Some soaps, such as toilet soaps, are soluble in water — castile soap, for instance, which is made from olive oil and soda. Other soaps are insoluble, such as lead, zinc, or iron soaps, which include the pigments made by the chemical union of white lead, zinc, or certain iron paints with linseed oil. Pigments are said to be more or less durable according to their soap-making powers in combination with linseed oil. Both red lead and white lead are strong soap-makers; zinc-white, iron-ore paint, umber, yellow ochre and others are less so; while such colors as ivory-black, vermilion, madder-lake, Prussian blue, etc., do not combine chemically at all with linseed oil, or, in other words, they are not soap-makers.

Those pigments that have the strongest chemical affinity for linseed oil — the strongest soap makers — dry and harden the most rapidly; those that have but a feeble affinity for it, or none at all, must be mixed with a drier — such as manganese or litharge — which has a strong affinity for it. While it seems to be certain that soap-making, either by the pigment itself with linseed oil, or by means of a drier, improves the solidity and durability of paint — unless it be rendered brittle by an excess of the drier — it is equally certain that all soap-making has a tendency to redden or yellow. Condit says of white lead that "it is a paint and not a whitewash only, because about one-fourth of the lead unites with the oil to form a soap . . . but it has such a tendency to redden that white lead made by a process (one of Gruneburg's processes) producing a large quantity of this part of white lead which unites with the oil would turn yellow in an hour after mixture as a paint." In one other place he says: "Strong soaps have more tendency to redden than weak soaps, when simply exposed to the air. . . . It is plain why lead changes color more than zinc: it contains more soap. Again, it is plain that boiled oil [with driers], which contains much oxy-linseed-oil-acid and much soap, will darken sooner and more completely than raw oil. To avoid change of color we must avoid that which most quickly dries and hardens the paint — soap. Even manganese driers with zinc-white will yellow the paint. It is important, therefore, for all these reasons, to use as little oil as possible in interior house-painting with white colors." It is also important to use zinc-white rather than white lead for inside work. The cure for this change of color is sunlight.

It has already been shown, in the paper on "*buon fresco*," that caustic lime forbids the use of many colors that are frequently used in oil painting. Caustic lime, moreover, combines with oil to make a soap. For these reasons oil painting cannot be used on fresh plaster. But even when the plaster is thoroughly dry, the walls should first be protected with several coats of oil paint, if they are to receive oil pictures; for even dry plaster (carbonate of lime, or chalk, and sand) changes some pigments, especially if the latter are exposed to dampness, which is almost inevitable. "All organic colors may be affected. Chalk in white lead or zinc-white easily produces a yellowish-white when mixed with oil. In addition to these changes, oil is saponified by wet chalk, which quickly becomes yellowish in the absence of sunlight. All oil-painted walls change color, and picture-frames hung on wet walls leave their photographs in reddish-yellow."[2] It is very obvious, then, that mural paintings in oil must never come in contact with plastered walls, but should either rest on several intervening coats of oil paint, or, better still, on a canvas ground fastened to the wall by the white-lead process.

The yellowing of oil is not caused by soap-making alone; it is also caused by want of sunlight. The less light there is, the yellower and darker oil-mixed pigments grow with time. Every artist must have noticed how oil sketches yellow or darken in a portfolio. As usual the cure is sunlight. Here are one or two corroborative extracts by Condit. Dr. Liebreich says that "the oil should in all colors be reduced to a minimum, and under no form should more of it be introduced into a picture than absolutely necessary." "The changes in white lead and linseed oil are rapid and inevitable. A foul, tawny yellow quickly overspreads the work, utterly destructive of delicacy and freshness." (*Quarterly Review.*)

Certain pigments common in oil-painting, such as white lead, chrome and Naples yellow, Prussian blue, English emerald green, etc., are liable to be blackened by sulphuretted-hydrogen gas, white lead in particular. As many inaccurate ideas are apparently entertained as to the influence of sulphur gases on pigments, it will be well to state the case accurately. Sulphuretted hydrogen is the product of sewage, or of animal and vegetable decomposition. A stream of this gas turned on dry white-lead paint will change it to a deep umber.[3] Professor Norton says that the "white lead blackened by sulphuretted hydrogen will bleach by the action of sunlight easily, until the oil has become perfectly hard, a process which takes several weeks. After the hardening this bleaching action is slow, but it is probable that it always continues to a greater or less extent. It is thought to be due to the ozone in the air." Fresh paint blackened by sulphuretted hydrogen bleaches rapidly, even in diffused daylight. One naturally asks, "How much danger from blackening by this gas do paintings undergo?" Perhaps less than pessimists imagine. The white-lead paint of whole neighborhoods has been blackened by sewage gas. It has also been blackened to a considerable extent in certain manufacturing districts. Bath-rooms, too, have suffered in this respect. There would, however, be no great danger from it in well-drained houses. It must be present in very appreciable quantities to blacken paint. Much that is erroneous has been written about the discoloration of pigments by the chemical action of certain gases, the product of burning illuminating-gas. These are sulphurous and sulphuric acid gases — the latter containing more oxygen. But neither blackens lead, though they both attack bronze.[4] Sulphuretted hydrogen in very small quantities escapes combustion, but hardly enough of it to blacken the pigments. What does very sensibly blacken pigments over a gas-jet is the carbon of the smoke, as every one must have observed. If the colors are thoroughly dry, the carbon can easily be removed: if not, it adheres tenaciously. Probably the heat of the gas often softens pigments mixed with oils or resins, thus affording the carbon a secure lodgment. There is also sulphurous acid and sulphuric acid in all chimney-smoke, and very probably a little unconsumed sulphuretted hydrogen. But it is the latter that blackens. The paintings by Baudry, in the *foyer* of the Opera at Paris were covered with a layer of carbon a few months after the opening of the building. It was feared that they were seriously compromised. Recently the gas has been replaced by electricity, the pictures have

Sala del Collegio, Ducal Palace, Venice.

[1] Continued from page 173, No. 537.

[2] *Painting and Painters' Materials.* Charles L. Condit and Jacob Scheller: New York, 1883. An excellent, practical book, which treats at length of varnishes, oils and pigments, and their reciprocal relations.

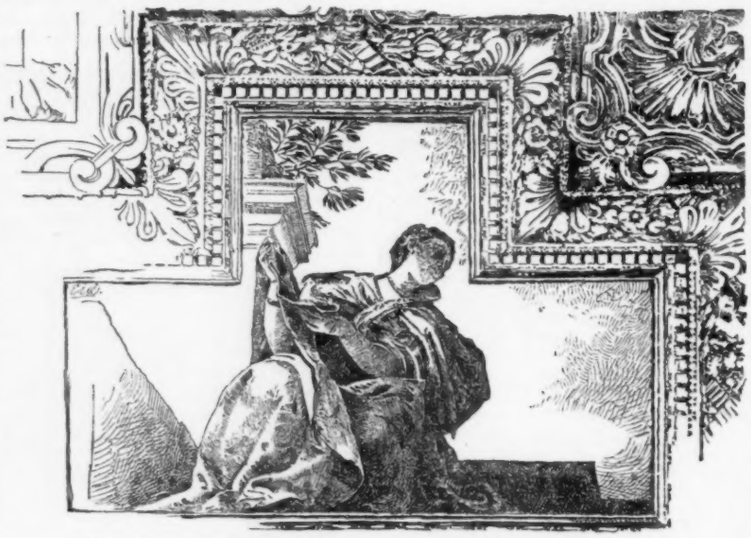
[3] It was shown in Paper V, that the same stream turned on oil-white-lead mixed with the wax medium had no blackening influence.

[4] In answer to a question, Prof. Norton writes that "Gold would not be affected by the acids. I have heard it said that it tarnishes after a term of years in such a position [over a gas-light]. The side of the State-House [Boston] dome next the chimney is tarnished, as probably you are aware. Exactly why gold tarnishes in such a position I am unable to say. Probably from some sulphuretted hydrogen present in the gas which escapes the combustion."

With regard to the moisture generated by the combustion of illuminating gas, and its possible injury to mural paintings, he says: "When gas is burned, all the hydrogen in the gas, both free and combined with carbon, is turned to water. A very considerable amount of water would thus be formed. If the room were suddenly cooled, moisture might gather on the walls to a slight extent. On the other hand, the burning of gas always raises the temperature."

been cleaned, and, if we may credit the rather unscientific accounts, they are as fresh as when first painted. The discoloration of lead pigments by sulphuretted hydrogen can, to a certain extent, be removed by the action of oxidizing agents, such as hydrogen peroxide, which, acting on the lead sulphide (black), converts it into (white) lead sulphate. It is therefore evident that white lead should be replaced whenever it is possible — and certainly for the finishing coats — by zinc-white, which "is the only perfect white color," not being affected by sulphuretted hydrogen, nor yellowing, to any great extent, the oil with which it is mixed.

I have endeavored to show, as concisely as possible, why it is that oil paintings darken with age. Any one, probably, by a slight effort of the memory can corroborate this fact. I never remember to have seen an old oil picture that had not grown dark. Under certain circumstances, of an exceptional nature, which will be noted later, a slight darkening, or rather mellowing, may not be objectionable; on the contrary, it may even be advantageous; but where a light, decorative effect is intended, and especially when the surrounding tones are white or delicate in color, and have not proportionately mellowed, the effect is very discordant. Not unfrequently oil paintings are inserted in the panels of a room — a salon or boudoir, for instance, treated in white and gold. Within a very short time, perhaps at the outset, they will seem dark and heavy, as compared with the gleaming white (usually zinc-white, turpentine, and just enough oil to bind it) of the woodwork. Sometimes this is repainted after a lapse of years, while the pictures, of course, remain untouched, and this operation may be repeated, till the pictures look like black spots in comparison. In rooms of this description either the same mellowing ingredients should be used for the woodwork that are used in the oil pictures — which would annul the desired effect — or the paintings should be pitched in a whiter key than is possible in oils. But whatever may be thought about the darkening of decorative canvases or panels painted in oils, there can be no doubt about the darkening of oil pictures painted on plaster; it is both swift and sure. There is great doubt, in my opinion, whether even a heavy priming of the plaster with several coats of oil-paint would eventually protect the pictures from the action of the lime, not to mention other darkening influences. To cite a deplorable example of a prematurely and utterly ruined oil painting on a plaster-wall, I have only to name the "Last Supper"(1498), by Leonardo da Vinci. "Ignoring the old method of fresco-painting," says J. P. Richter, "Leonardo mixed his colors with oil — a fatal innovation, as it proved. Donato Montorfano's fresco of the 'Crucifixion,' painted in 1495, which faces the 'Last Supper' in the same refectory, is to this day in an excellent state of preservation, while Leonardo's production in its shattered condition is a melancholy proof of the falsity of his theory. Already his pupil Lomazzo, in his '*Trattato della Pittura*,' says of it, '*La pittura è rovinata tutta*,' [the painting is entirely ruined]. In the course of a few centuries it has been repainted no less than three times." Murray, in his "*Northern Italy*," gives some interesting information concerning the causes that led to the decay of this celebrated painting. As all the conditions attending the production of a decayed mural painting are of great import to the decorator — for they are his warning beacon-lights — and as this particular painting is world-renowned, it will be well to make one or two pregnant quotations: "Leonardo employed sixteen years upon the work; but he used a new process, which proved its ruin. The ground is plaster, impregnated with mastic or pitch, melted in by means of a hot iron. This ground he covered with a species of priming, composed of a mixture of white lead and some earthy colors, which took a fine polish, but from which the oil-color flaked off. The materials with which the wall was built are of a very bad quality, rendering it susceptible of injury from damp. As early as 1500 the refectory seems to have been flooded, owing to its low situation. The vicinity of the kitchen smoked the painting, which exhibited early symptoms of decay. . . . Scanelli, who saw it in 1642, speaking hyperbolically, observed that it was then difficult to discover the subject. . . . In 1800, owing to the drain being blocked up, and the rain falling for fifteen days, the refectory was flooded to a considerable depth. The late Professor Phillips, R.A., in 1825, examined its condition with careful and minute attention, and could with difficulty find a portion of its original surface. . . . Till this time all paintings on walls had been wrought in fresco; but oil painting, which had become known and practised in smaller works, better suited da Vinci's mode of proceeding, as it admits of retouching.[1] . . . It would appear that the vehicle which he employed, whatever it was, had no union with the ground, and, therefore, the surface cracked. At the opposite end of the refectory is a very large and well-preserved fresco of the 'Crucifixion,' by Montorfano. . . . The good condition of this painting causes one the more to regret that Leonardo did not employ fresco. His error is very curiously exemplified on this same wall. You see two white spaces in the corners. Here Leonardo painted in oil the portraits of the donors of the Cenacolo, but only a trace of the figures can be discerned." Scaling is the disease to which the disappearance of all these paintings by Leonardo in the refectory must, in the main, be attributed.



An Oil Panel by Veronese in the Ceiling of the Sala del Collegio, Ducal Palace, Venice.

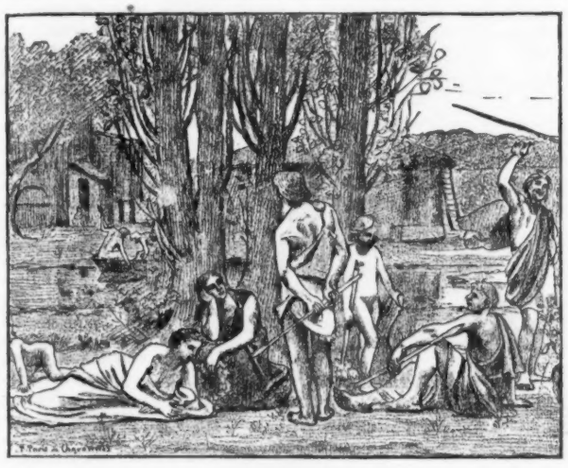
Every student of the Vatican *Stanze* knows that two of the allegorical figures in the Hall of Constantine — "Justitia" and "Mansuetudo" — were executed in oil by Giulio Romano and Francesco Penni, from the cartoons of Raphael, and under his supervision. It would be difficult to say with authority why this experiment was made: one can only surmise. Shortly after the death of Raphael, the frescos in the stanza of Heliodorus had so deteriorated in places that they were clumsily retouched by Sebastian del Piombo. (This deterioration could not have continued, for to-day they are in a fair state of preservation.) Possibly they may have exhibited symptoms of decay in the life-time of Raphael, who may have wished to substitute for fresco an apparently more durable process. It is not improbable that he was incited to the change by Sebastian del Piombo, who seems to have been a gossip, mischief-maker, and — if I may use so unclassical a word — a "blower." This Venetian artist had established a reputation as a colorist in Rome, and his deficiencies in design were supplemented by Michael Angelo's pencil. He had executed several mural paintings in oil, and, with his accustomed brag, had doubtless vaunted their superior force and richness. (Lanzi says of his "Flagellation," painted in oils on stone in the Church of S. Pietro in Montorio, that it is "as much blackened by time, as the frescos which he executed in the same church are well-preserved.") That he was the champion of oil painting for walls, is evident from his letter to Michael Angelo concerning the decorations in the Hall of Constantine, undertaken by the pupils of Raphael just after his death. He writes (pretending to quote Cardinal Bibbiena) "that they had executed a specimen of a figure in oil on the wall, which was a beautiful work of art, so much so that no one would now look at the rooms painted [in fresco] by Raphael, that this hall would excel the others, and would be the finest work executed in painting since the time of the ancients."[2] The adoption of his favorite process by the disciples of Raphael makes "him, for the moment, fair to them, and he relates their success in glowing terms." If such talk temporarily influenced Raphael and his followers, it was but for a short time. Penni and Romano soon saw that what was gained in strength by the use of oil, was more than offset by the loss of decorative effect. The experiment was confined to the two figures before mentioned, which were suffered to remain. With this exception the hall was completed in *buon fresco*. It was not then known that mural oil paintings would blacken with time. These figures are now much darker than the others, and less sound. The lower part, in particular, of the "Mansuetudo" has badly cracked, and shows signs of scaling, while no such signs are evident on the companion figures executed in *buon fresco*, which are still fresh and far more decorative. Michael Angelo's exaggerated and explosive, though not improbable, retort to those who urged him to paint the "Last Judgment" in oils, instead of in fresco, "that oil painting was an occupation fit only for women and idlers," undoubtedly meant that he did not deem oil a suitable

[1] "He would often come to the convent at early dawn; and this I have seen him do myself. Hastily mounting the scaffolding, he worked diligently until the shades of evening compelled him to cease, never thinking to take food at all, so absorbed was he in his work. At other times he would remain there three or four days without touching his picture, only coming for a few hours to remain before it, with folded arms, gazing at his figures as if to criticize them himself. At mid-day, too, when the glare of a sun at its zenith has made barren all the streets of Milan, I have seen him hasten from the citadel, where he was modelling his colossal horse, without seeking the shade, by the shortest way to the convent, where he would add a touch or two and immediately return." Bandello; from Richter's *Leonardo*.

[2] Wilson, from the Buonarroti Archives.

medium for mural decoration — for he knew how to paint in oils. Didron says that the modern Byzantines almost never use oils for mural decoration, because they hold them to be less durable than colors applied *a fresco*. The use of oils has certainly been known to them as far back as the days of Panselinos, for Denys, his follower, gives a receipt for painting oil pictures on linen. Notwithstanding this knowledge, fresco has ever been their means of decorative expression on the wall.[1]

Modern mural painters are prone to work in oil — and by oil is meant linseed oil or a like substitute, not an essential or volatile oil, such as oil of spike-lavender or spirits of turpentine — because it is a familiar medium. Mural painting is the exception; the easel picture the rule; therefore our painters are more "at home" with the technics of the latter, which, if large, is almost invariably painted in oil. In the sixteenth century it was not so; every man of note painted on the wall, and, though there was no lack of easel-pictures, these, in many respects, were mural paintings on a small scale, having all the grandeur of monumental compositions. The "Vision of Ezekiel," by Raphael, to mention a well-known example, might be reproduced on a colossal scale, without necessitating any technical changes. The stately Italians of that epoch could not, or would not be informal. Their forms are chosen and simplified. Literal nature, as we understand it, had no charm for them. Selection, idealization, elimination (decorative necessities) were the canons of their art. Our art, on the contrary, is more picturesque and intimate, and, at times, tends to be photographic. When our painters are called upon to execute monumental works, though they may have the good sense to modify their style to suit the exigencies of the work in hand, they naturally find it difficult and irksome to emancipate themselves from their every-day methods; and if, by a vigorous effort, they do manage to change both style and method, they are not unapt to run into the opposite extreme, by producing paintings of an archaic rudeness and simplicity. So it happens that they generally find it more convenient to paint in oils, sometimes on the wall



A Puvis de Chavannes.

itself, sometimes on a canvas, to be attached to the wall afterwards. That it is better to paint directly on the wall itself, has already been shown. At times one is inclined to think that the vanity of exhibiting the work before it is placed *in situ*, has enough influence with the artist to induce him to execute it in the studio. There is one thing to be said in favor of executing studio-painted wall-decorations in oils, and that is, oil is more elastic than the other media, and colors mixed with it are less likely to crack and scale when the canvas is rolled for transportation. The best contemporary mural painters, when they use oil, reduce it to a minimum, and deaden it by an admixture of spirits of turpentine, or wax, or by painting on an absorbent ground. The mural paintings of Puvis de Chavannes (who, according to Hamerton, paints in oil deadened by spirits of turpentine[2]) are certainly decorative and scholarly in tone and conception. But why use oil at all? It is not a necessity, and the painting will surely stand better without it.

It would almost be an act of supererogation to preach light tones for walls and ceilings in these days, such a strong hold has the out-of-door feeling taken on artists. Indeed, so little profit is drawn from the peculiar qualities of oil, that one is tempted to question their use even for easel pictures. A majority of the oil pictures in our current exhibitions might just as well have been painted in wax, distemper, or water-colors. Artists are painting water-colors in oils, to put it paradoxically; but do their best they can never equal the whiteness of water-colors (or the other media) in oils, because *oil is a yellow vehicle*. There was a time when the artist, if called upon to play the temporary rôle of decorator, was apt to pitch his work in the then mellow key of the oil easel-picture. Now painters pitch their easel-pictures in the light decorative key. So much the better for decoration. Whether or not it is better for the easel-picture is quite another thing, which it would be irrelevant to discuss here. Let it suffice to observe that in abandoning the glaze, and the rich transparent tones so easily obtainable in oils, we abandon processes that immortalized the Venetians.

We are now confronted by a decorative problem of an exceptional nature, the solution of which permits the use of oils. The easiest way to state it is to give a familiar illustration, which some of my readers may have been holding *in petto* as a protest against my condemnation of oil decorations. Almost every traveller has been impressed with the actual splendor of the halls in the Ducal Palace at Venice; but the imagination must be stimulated to picture its magnificence when the gilded carving on walls and ceilings, incasing the sensuous tones of Paolo, Tintoret and Titian echoed the opulence of sumptuously-clad senators. To-day all the pomp is above, and the floor looks starved. But in those days when Venice was in truth Queen of the Seas, there was pomp above and pomp below. Glistening frames and paintings harmonized with the sheen of stuff. It must have resembled a vessel of burnished gold, with precious stones therein, reflected and intensified by the polished metal. Fresco would have been too cold, formal and spiritual to sustain such magnificence. Its pale, dead surface would have ill accorded with a gorgeousness that was Byzantine rather than Italian. A warm, shining medium, such as oil or varnish, was needed to complete the harmony. Tintoret's "Paradise" has sadly blackened with time, but it is less noticeable here. The massive gold frames counteract in a measure the darkening of years, and here we have the *rationale* of the gold frame for oil pictures. When these are not pitched in a water-color key, the slight yellowish tint induced by the oil, varnish, or time, or by all three, improves rather than injures them, provided of course, the yellowing be not carried too far. The rich, yellow tones of the frame, with its countless reflections, not only enhance the mellow tones of the picture, but they nullify the dirty quality which the same picture would apparently have if framed with pure white. It must be remembered that oil is a yellow medium, while the vehicle for water-colors, fresco and wax-painting is colorless. For the most part the Venetian paintings in the Ducal Palace are really easel-pictures attached to the walls and ceilings, not because they are painted on canvas, but because they have the qualities of easel-pictures. So, too, has the series of paintings by Rubens for Maria de' Medici, [See Illustrations.] which probably look just as well on the walls of the Louvre as they did on the walls of the Luxembourg. We must bear in mind, however, that the easel-pictures of these great masters, if not decorative in tone and chiaro-oscuro, were always monumental in form and composition. The modern painters, on the contrary, are normally decorative in tone, but un-monumental in design.

When effects, similar to those in the Ducal Palace are desired, the use of oil is legitimate. It is often advantageous to employ color transparently on metallic grounds, and then oil is a very convenient vehicle, though such a varnish as Siccative of Harlem diluted with spirits of turpentine might be substituted, perhaps advantageously. But whenever oil is used it should be with the greatest moderation.[3]

Frederic Crowninshield.

[To be continued.]

Decay of the Egyptian Obelisks.— An early prediction (1862) of the decay of the Egyptian obelisks when removed, was made by Dr. Alfred Stelzner, of St. Petersburg. "You know, perhaps," he remarked, "that the Alexander column in St. Petersburg was transported from Finland to St. Petersburg in the thirties of this century, at a senseless cost, and, with the assistance of thousands of men, was erected. But even in a few years the granite did sad honor to its Finnish name of 'Rappakivi'— *i.e.*, the 'lazy-stone.' The granite commenced to weather, and weathered merrily on in spite of all technical and scientific commissions; and one can well say that the years of the proud monument are numbered. General Helmersen says the granite contains many large feldspar crystals. But the feldspar is triclinic, and, therefore, expands under the great differences of temperature between the St. Petersburg summer and winter, differently in the directions of its three axes; hence comes the crumbling, owing to the unequal molecular movement throughout the entire mass of the monolith. If this explanation is correct, then from the similarity of the rocks from Finland and Syene, and the great difference between the summer and winter temperature which exists also in New York, an unsuspected danger threatens the old Egyptian monolith, which has always hitherto stood in a mild and equable climate. Perhaps, also, it will succumb to the weakness of old age, for the London Needle of Cleopatra is said to be beginning already to crumble in its new home."— *Iron Age.*

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[1] "Because," said Father Joasaph, "to paint in oil's it would be necessary to wait till the plaster is dry, and, as the color would not [then] penetrate the plaster, it would be less solid." This explanation — as rendered by Didron — is not altogether satisfactory. Possibly the crust of carbonate of lime, that forms on plaster, might prevent the penetration of the colors. If this were removed by scraping, the ground would be too absorbent — unless it were thoroughly saturated with oil, or an equivalent, an operation, perhaps, requiring more time and money than the Athonites could afford — and the colors, deprived of the oil that binds them, flake off, or fall off in powder.

[2] I have just received a letter from a former pupil, now profiting by the counsels of Puvis de Chavannes, which states that he [Puvis] "paints on canvas prepared with plaster [of Paris probably], which gives his work that dead surface, and uses common oil-paints."

[3] I would have liked, both in this and other papers, to institute several interesting comparisons between mural paintings — especially modern paintings — executed in different media, had I been sure of the processes. It was impossible to verify these processes except at a cost of time and labor that the result would not have justified. The only authorities that I could consult on this side of the Atlantic, either disagreed, or — from certain indications not worth noting here — did not command my confidence.

ART IN PHŒNICIA AND CYPRUS.[1]—IV.

Capital from Djezza. Height, 20 in. Diameter, 18 in.

THE necropolis near Sidon is larger than that at Amrit, but yet so small that M. Renan thinks it could hardly have sufficed for so important a town. And the presumption that the chief burial-place of the Sidonians is yet unknown to us, is strengthened by the fact that but few of the tombs or the objects found within them seem to date back beyond the time of Assyrian dominion. None of the sepulchres have preserved their above-ground members, but the subterranean plans are similar to those at Amrit. In the earliest examples neither niches nor sarcophagi were used — the bodies were laid on the floor or placed in graves excavated therein. In the later examples were found the anthropoid (or human-headed) sarcophagi, to which further reference will be made when we come to speak of sculpture.

In the neighborhood of Tyre there is still less to reward the antiquary's search. Tombs there are in plenty, but "sarcophagi, graves, niches, have all been gutted many centuries ago. Nothing more naked and bare than these tombs could be imagined." And there are no inscriptions to even suggest a date. There is but one monument in the district which excites interest — that which is locally called the "tomb of Hiram," but this, too, is without inscription or helpful sculptured detail. It resembles the Amrit monuments, but is more rudely wrought.

Near Gebal the tombs are cut into the side of the rock above ground, and entered on a level. Inside there is no decoration, but on the exterior there is sometimes a slight architectural adornment — as once, a triangular pediment with a large rosette in the centre.

Passing from Phœnicia proper to her colonies, we find at Cyprus the most interesting sepulchral relics. But I need hardly stop to describe them here — Cesnola's book is too well-known to American readers. I will only note that while M. Perrot does not, by any means, implicitly accept all the statements therein given, and speaks with much doubt of the illustrative plans, etc., he puts his doubts and objections in a courteous, graceful, truly Gallic way, that is a pleasure indeed, after all the bitter, violent, wrathful words the subject has excited in so many other quarters.

Not from Cesnola, however, but from Ross — a German explorer, who published his Cypriote travels in 1851 — our author takes the plans of certain tombs at Neo-Paphos, which show "a group of chambers connected with a rectangular court, open to the sky and surrounded by square shafts and circular columns. The court, the colonnade, the chambers attached, and the corridor by which the court is reached — all are cut in the living rock. . . . None of these tombs can be older than the fifth century B. C. The columns, with their capitals and the entablature they support, are Greek (Doric) in the details of their architecture. There is even one detail which seems to hint that these colonnades are later than Alexander — the frieze is deeper than the architrave. . . . But we are justified in mentioning these remains here, because, although their details are Greek, their plan is very different from anything we are accustomed to see in Greek tombs. We find these rock-cut quadrangles neither in Ionia nor upon the mainland of Greece; on the other hand, though none have yet been encountered in Phœnicia, several examples may be pointed to in the neighborhood of Jerusalem." "Finally, we must not forget to note that in the whole of what we may call Phœnician Cyprus, the tomb is as mute as it is on the mainland."

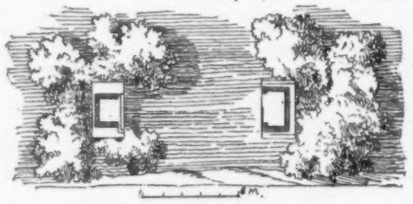
The tombs of Carthage are singularly simple and singularly unvaried. They are all subterranean, carved in the soft limestone rock. And they, too, have been so thoroughly pillaged and devastated as to tell the student little. Upon their difference of plan from those of the mother-country we cannot here dwell, nor upon the diversities exhibited in the burying-places of the colonies of Carthage. We can only recapitulate the subject of Phœnician burial in an abridgment of our authors' words: "The Phœnicians never burned their dead. From first to last, they placed them underground. With the passage of time natural grottos were superseded by artificial chambers cut from the rock. In these every variety of sepulchral bed is to be found. . . . The marked predilection shown by the Phœnicians for this method of entombment was in strict harmony with their practical, utilitarian genius; they sought for economy in everything they did; they hated all unnecessary expenditure of time, effort and money. It is, perhaps, to this trait in their character that the absence of funerary inscriptions is to be traced. . . ."

When we come, now, to speak of the religious architecture of the Phœnicians, the data are scanty enough.

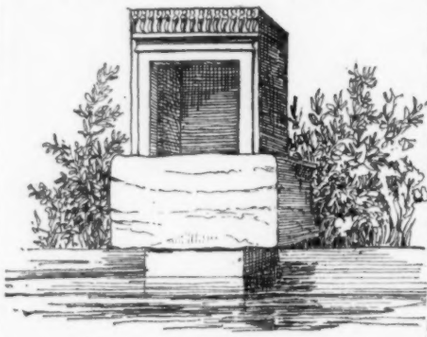
[1] *History of Art in Phœnicia and its Dependencies.* From the French of George Perrot and Charles Chipiez. Translated and edited by Walter Armstrong. In two volumes, illustrated. London, Chapman & Hall, Limited. New York, A. C. Armstrong & Son. 1885. Continued from No. 538, page 184.

The earliest religion of the tribes which peopled Syria was fetischism — their earliest devotion was paid to natural phenomena. The most ancient sanctuaries seem to have been not temples at all, but mere altars, standing probably in groves, on the top of some natural elevation. "The only temple which still exists on the soil of Phœnicia is nothing more than the reduction of an Egyptian shrine adapted to the soil and the habits of its new country." It stands at Amrit, and is a small rectangular cella, open on one side, and placed on a high plinth formed of the living rock. A single stone forms each of the three sides, and another, hollowed into a flat arch, the roof. This roof projects in front, and was probably supported by metal columns. The structure was surrounded by a platform or court-yard, levelled out of the rock; and, beyond, the rock remains to form an encircling wall, which is now some seventeen feet high in its highest portions, and was doubtless brought to a uniform elevation by the addition of hewn stones where necessary. Traces of pillars have been found at the four corners of this enclosure some twelve feet within the wall, and traces for the support of beams in the wall itself; so an interior roofed gallery, resting on intermediate shafts of wood or metal, was formerly, without doubt, an important feature of the whole. The details of the shrine itself are of a modified Egyptian character. No other temple-arrangement of this sort has been found in Phœnicia — nothing else at all, indeed, save two small monolithic shrines discovered by M. Renan, not far from Amrit in a laurel grove. Both are now broken in pieces, but a careful restoration is shown in the accompanying illustration. They faced one another, as the plan shows, but of the other features of the arrangement nothing survives.

Very little is known of the internal arrangement and furnishing of the temple in Phœnicia proper. A mutilated inscription on the *stèle* of Jehaw-Melek, king of Bylos, tells us, however, that in a temple which he built or restored there was a bronze altar (either in the temple itself or in its precincts); that gold was largely employed in the decoration of the building; and that it had a portico and columns. Votive offerings in the shape of *stèles* or figures seem to have been customary. For example, the many figures found in Cypriote sanctuaries, once supposed to be figures of deities or portraits of successive priests and priestesses, are now recognized as nominal portraits of those who came to pay their devotions and their vows to the gods, or, as M. Renan puts it, mementos of the bargain struck with the god — reminders, lest he should forget *his* part of the agreement.



Plan of the Two Tabernacles at Ain-el-Hayat. From Renan.



Monolithic Tabernacle at Ain-el-Hayat. From Renan.

The temples of Cyprus, as M. Perrot remarks, are thrice-famous through the words of ancient writers; but many as have been the explorations of recent years, our knowledge of them is very unsatisfactory. Again, we are warned not to trust Cesnola too implicitly, nor, on the other hand, to give too implicit credence to those whose testimony is opposed to his. And, again, I am obliged to pass over his arguments as too long and complicated for these pages.

The islands of Malta and of Gozo contain some most interesting remains. They are temples undoubtedly, and just as undoubtedly Phœnician. "We find in them none of the features which distinguish the religious buildings raised by the Greeks and Romans." The so-called "Giganteia" of Gozo — long attributed by the natives to nameless mythical or even superhuman hands — comprises two temples close together, but without any direct communication between. "Their doorways face westward and open on a long hall which binds them to each other, forming a façade for both. The axes of the two are parallel, and their plans are almost identical, but their dimensions are by no means the same. . . . Each consists of two halls communicating by a narrow passage; their shape is an elongated ellipse. In line with the outer door and the passage, the building ends in each case in a small apse or hemicycle, the floor of which is raised slightly above that of the chamber from which it opens. Each side of each chamber is finished with a similar apse, having a similar dais, giving to the whole a certain resemblance to the choir and side chapels of a modern Roman Catholic Church. . . . The right-hand apse in the first hall (of the larger temple) was reached by a flight of semi-circular steps projecting out into the body of the chamber. . . . It was here that the most unmistakable traces

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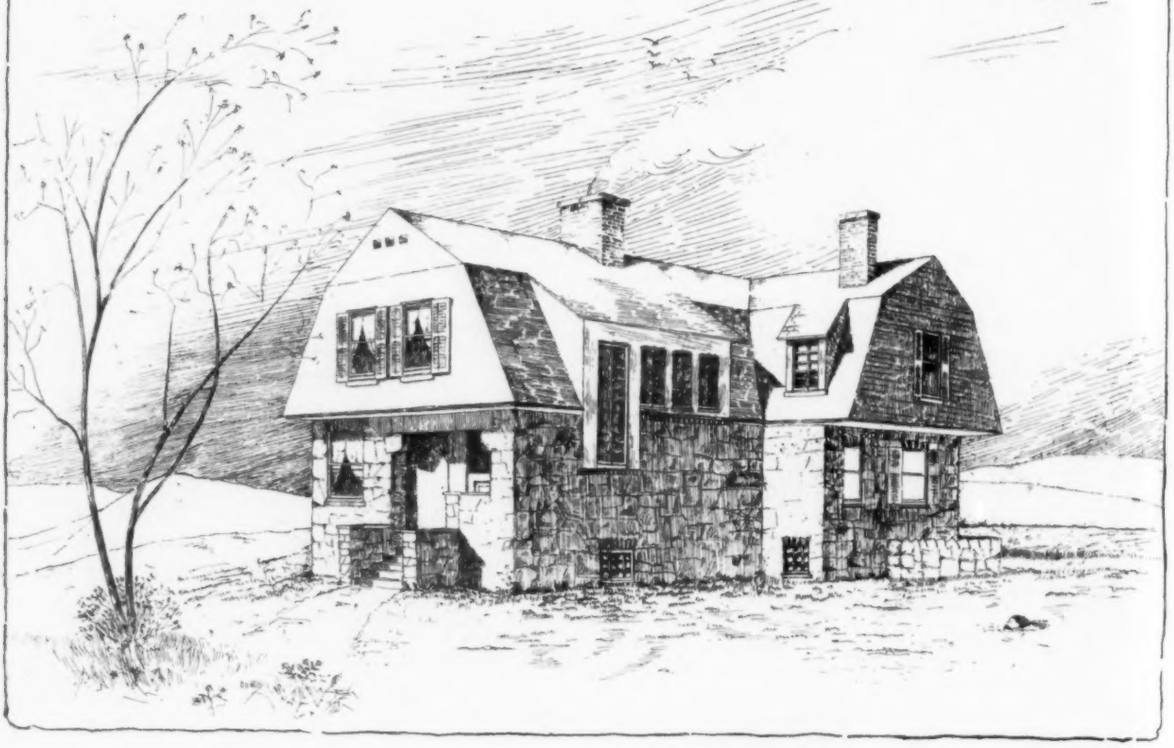
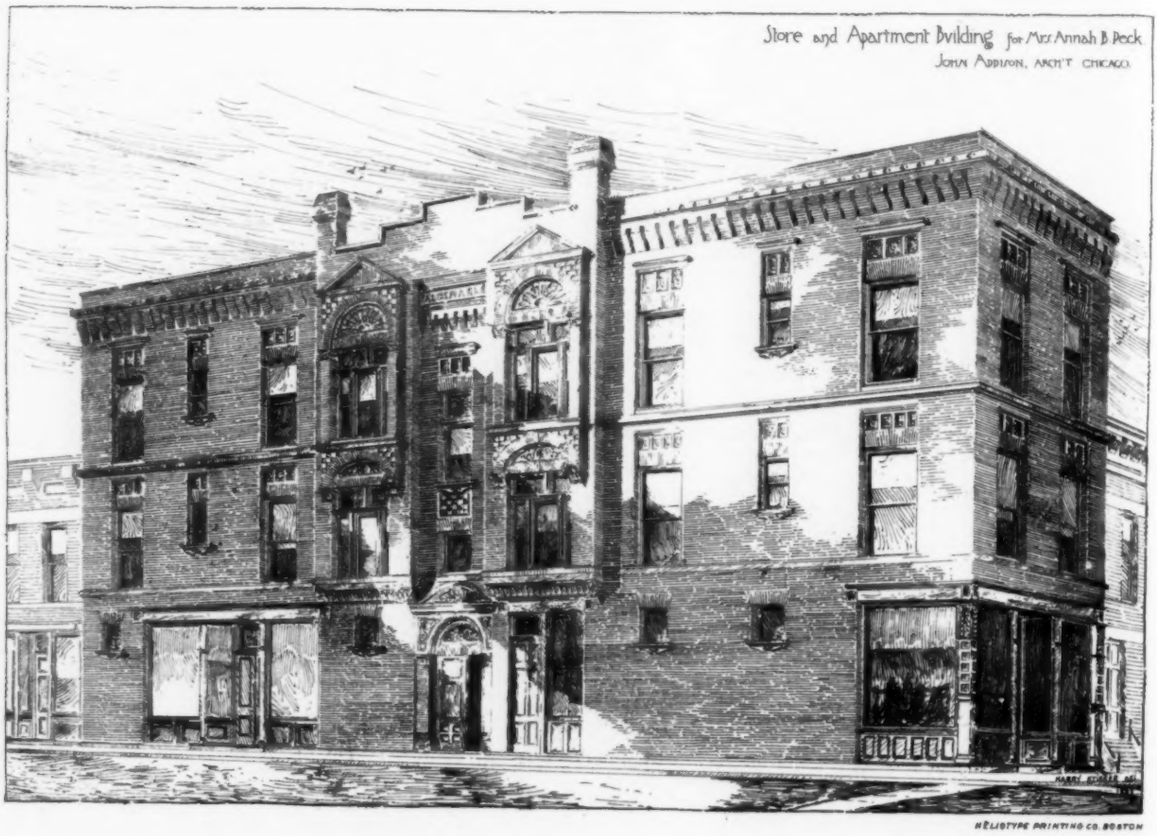
Cottage at Germantown Philada Pa.
for Mrs. J. W. Johnson.

Limpley Johnson Archt.
431 Walnut St Philada Pa.



Store and Apartment Building for Mrs. Annah B. Peck.
John Addison, Arch't Chicago.



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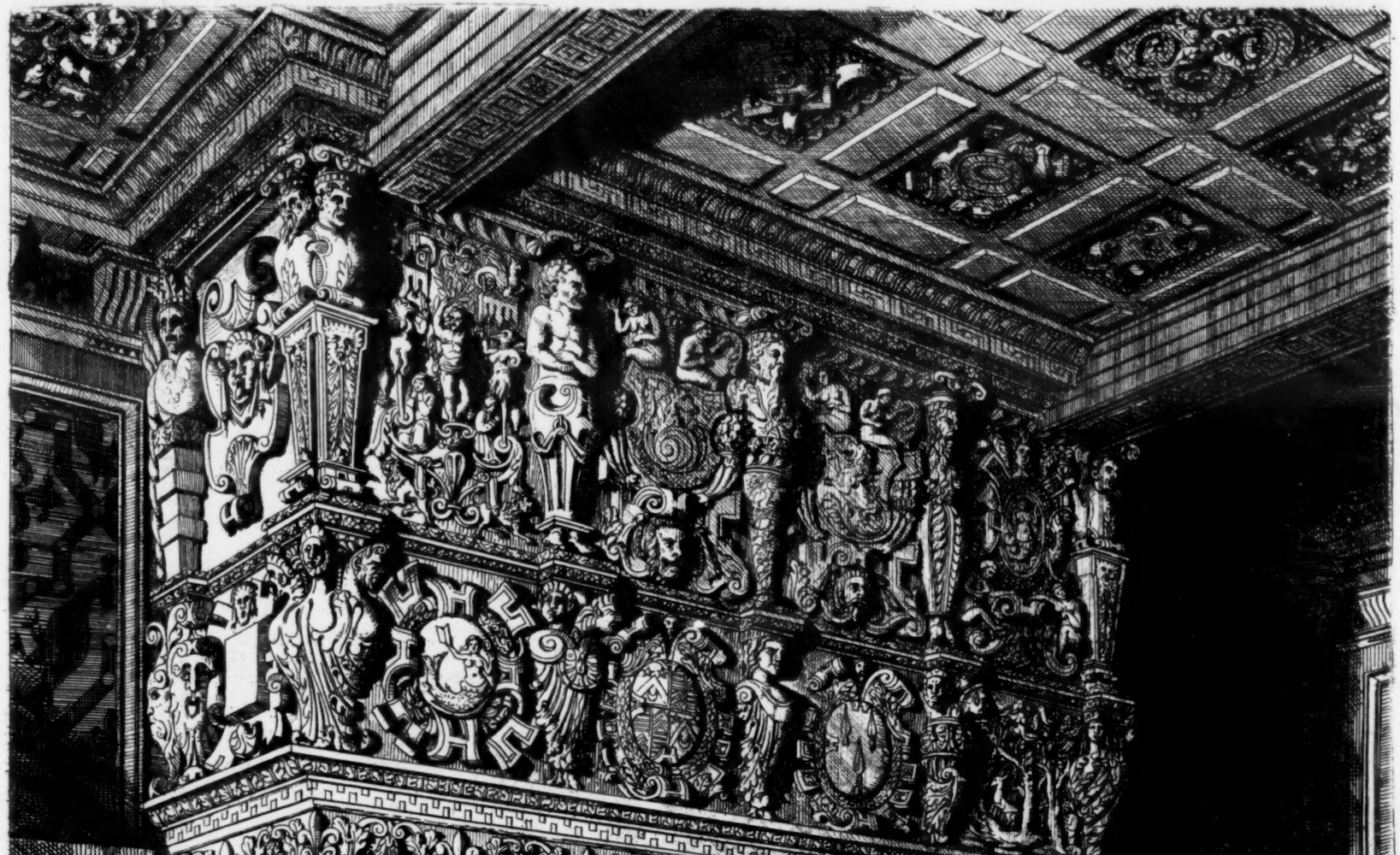

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Rochebrune ac,

CHEMINÉE D'UN ATELIER DE GRAVEUR

[MONITEUR DES ARCHITECTES]

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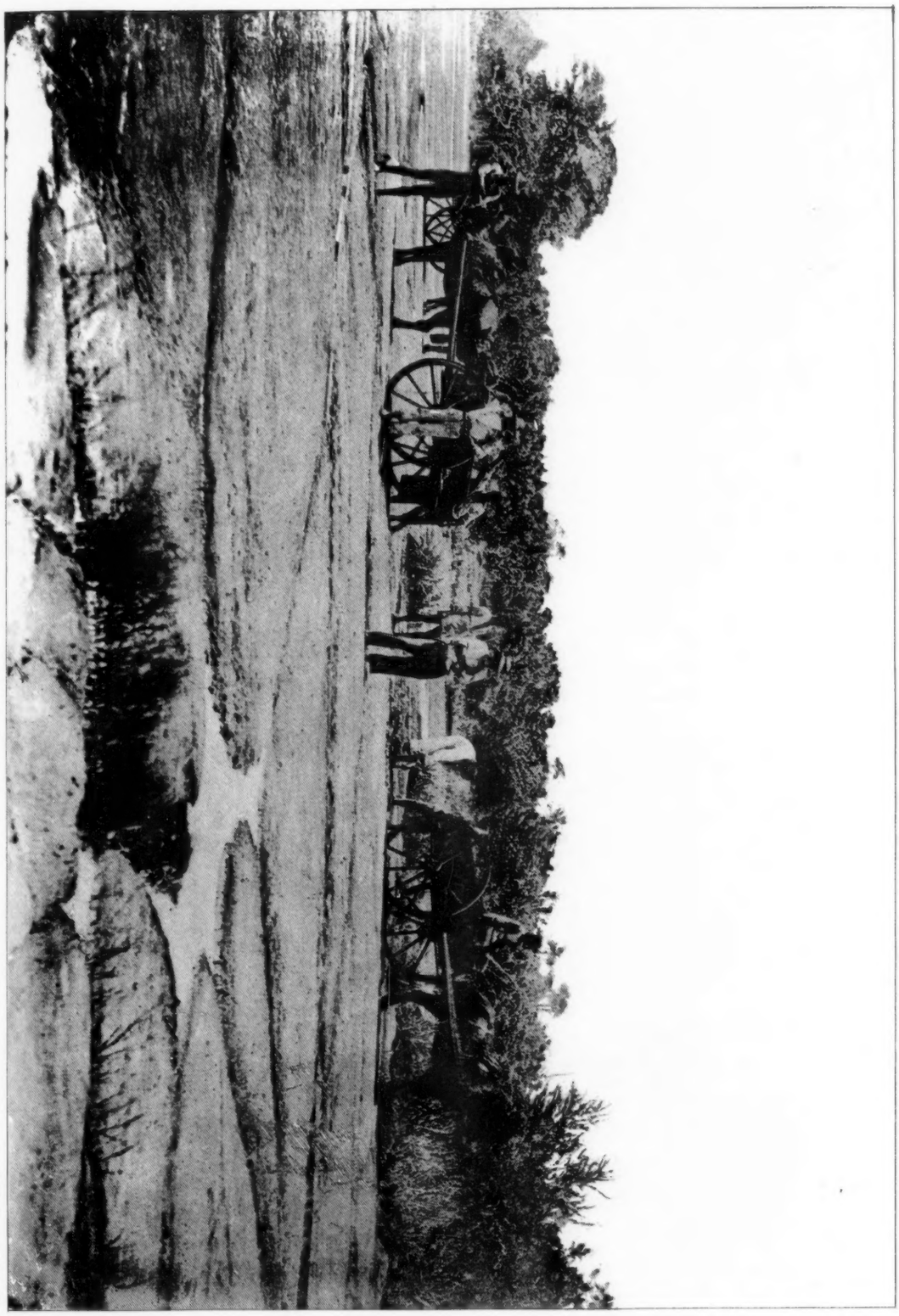

The Asphaltum Lake, Trinidad, W.I.

HELIOTYPE PRINTING CO. BOSTON.

AMERICAN ARCHITECT AND BUILDING NEWS, APR. 24 1886. No. 539

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Le voyage de la Reine au Pont de Cé.

La Reine a cheval le casque en tête ainsima vue autre Bellone va prevenir vne guerre civile qui se preparoit par les tumultes du Pont de Cé. Cette Princesse est accompagnée de la Victoire, et de la Renommée qui sont en l'air, et de la Force qui la suit a pied avec ses armes. Le fond du Tableau est la ville du Pont de Cé, et au dessus de la ville on voit vn aigle qui pesanti des oiseaux de rapine; Allegorie qui signifie l'attention qu'avoit la Reine a dissiper les ennemis de l'Etat.

La conclusion de la Paix

La Reine ayant acheué le traité de reconciliation auec le Roy, est conduite par Hymen au temple de la Paix. L'Vnion et le Pouuoir, et la Paix sur le deuant du Tableau foulent les instrumens de la guerre pendant que la Fraude, la Fureur et d'autres semblables vices veulent s'opposer aux bons desseins de la Reine, et font en derniers efforts dans le transport de leur desespoir.

[After Oil Paintings by Peter Paul Rubens.]

HELIOTYPE PRINTING CO. BOSTON.

of the ancient worship — a worship in which the divinity was represented by the same emblem as at Byblos and Paphos — were found. The symbolic cone had been overturned, but its site was easy to recognize. . . . The whole building is four hundred and forty feet in circumference, and eighty-eight feet in greatest length, internal measurement. . . . There is no sign of any kind of roof. The sacred emblem alone seems to have been protected from the weather. . . . In the right-hand apse of the second chamber there is a basin cut in the rock which forms the floor; it was used, no doubt, for ablutions. [Similar basins occur in many other remains of Phœnician temples, and suggest the "brazen sea" at Jerusalem.] In front of the apse in the first hall the stones are covered with an elaborate decoration of spirals and of bosses. . . . On one block a snake or an eel-shaped fish is chiselled." The second temple is smaller and simpler, but similar in plan. At Malta, in the temple called Hagiar-Kim, we have an analogous, but less regular plan; again, with numerous apse-like projections. The masonry in both islands shows the Phœnician characteristics which have already been described — the preference for huge units and for cutting whole features, columns and doorways, for example, out of a single block.

In Sicily the Phœnician temples have left no such distinct traces of their former shape; and "in Carthaginian Africa no temples earlier than the Roman conquest have been found, but various signs prove that it possessed buildings whose decorations had certain features in common with those in other parts of Greater Phœnicia." The capital from Djezza, here reproduced, is doubtless late in date, as the general features of the design are classic. But, alike in execution and in proportion, it is characteristically Phœnician.

Carthage herself was, as we all know, twice taken by the Romans, and by them deliberately destroyed and rebuilt. No temple earlier than the time of Scipio survives, and even the early site can be fixed upon but in a single instance.

Thus, says M. Perrot, our materials for reconstructing the Phœnician temple are scanty enough. "At Malta and Gozo, where the remains are clear, we are in presence of buildings of the second or third class, which cannot be taken as worthy representatives of the national architecture." From Cyprus we may, perhaps, look for further light "when the ruins are systematically explored." But meanwhile, "in spite of the scantiness of our data, the individuality of the Phœnician, or rather of the Semitic temple, stands out with sufficient distinctness to allow the historian to grasp its salient features. It is distinguished from the most familiar of our types, that of Greece and Rome, by one capital difference; it attaches much less importance to the *cella*, the chamber in which the image or symbol of the god is placed. It consists of a great court, or open-air hall, in the centre of which, or at one extremity, rises a tabernacle or pavilion, with the emblem of divine power beneath its shelter. In Greece the attention of the architect was concentrated on the cella, the home of the god, the dwelling-place of his often colossal statue; in Phœnicia the symbol was of no great size. The grandiose feature of the Semitic temple was the *peribole* — the court-yard with its continuous portico, which in some cases included a fine order and a rich scheme of decoration." It is needless to mark the analogy between such a plan and that of the temple at Jerusalem, as described in the Bible. And our authors note its survival in the more modern temples of the Semitic race — in the old mosques of Cairo, for example, and the Caaba at Mecca. "The primitive form of worship of these people was the *courban*, or sacrifice offered on a high place, which is still practised near Mecca on the occasion of the great pilgrimage. At first, their temple was no more than a clearing of levelled earth at the top of a hill, where the altar of sacrifice was raised within a belt of trees. As civilization advanced, and the religious notions of the people became more complex, the Phœnicians borrowed from the Egyptians the idea of a tabernacle in which to lodge their fetish. . . . Thus far the Phœnician temple is founded upon that of Egypt, but it seems never to have been a servile copy. It was not hidden, like the great buildings at Luxor and Karnak, behind a huge wall; it had no labyrinth of dimly-lighted chambers lying between the sanctuary and the outer air. Perhaps through want of skill rather than want of inclination, Phœnicia substituted wide courts for the hypostyle halls of the Pharaohs."

"In spite of its simplicity, the Semitic type of temple had a grandeur and nobility of its own. . . . It was the first type to meet the pioneers of Greek civilization. . . . The Greeks began by borrowing from it, and even when, by their own genius, they had created an entirely new system of religious architecture, their buildings still preserved some traces of these early lessons. We may thus explain a peculiarity of Classic architecture which has hardly received all the attention which it deserves. The *peribole* is much more important in the Greek temples of Asia than in those of Europe. It is only in Asiatic temples, like those of Magnesia and Ephesus, of Miletus and Samos, that we meet with these vast and richly-decorated quadrangles. . . . Whether the Ionians were directly inspired by the Oriental type, or whether they took possession of temples built by their predecessors on the coast (as they are supposed to have done at Ephesus), is of slight importance. The great thing to remember is, that in certain temples belonging to this country signs of Semitic influence are to be traced even at the height of the Classic period. And the likeness was not only in the arrangement of the building. The Ephesian Artemis was the sister of the Phœnician Astarte; she was, in fact, the same nature-goddess under another name. The two conceptions being almost identical, is it surprising that the rites had much in common, and that a similar community may be traced in the buildings in which those rites were performed?"

From classic texts, rather than from actual relics, we may gain an idea of how the comparative inferiority of the Phœnician temple, as contrasted architecturally with that of Egypt or of Greece, was redeemed by a wealth of decoration and movable adornment. But my chapter is already too long, and nothing has as yet been said of those utilitarian works which are the most striking monument of the Phœnician architect.

M. G. van Rensselaer.

Illustrations

[Contributors are requested to send with their drawings full and adequate descriptions of the buildings, including a statement of cost.]

THE UNION LEAGUE CLUB-HOUSE, NEW YORK, N. Y. MESSRS. PEABODY & STEARNS, ARCHITECTS, BOSTON, MASS.

[Gelatine Print, issued only with the Imperial and Gelatine Editions.]

It will be interesting, we think, to turn from this print to the reproduction of the architect's successful design which we published on September 20, 1879. The present view was taken on the day when all New York, or at least the Gallic element, was celebrating the arrival of Bartholdi's Statue of Liberty. The regents of the club apparently desired to signify their own good will by hoisting the French tricolor, but the janitor blundered by flying it beneath the stars and stripes as is shown in the print.

THE ASPHALTUM LAKE, TRINIDAD.

It is rather curious how things dovetail together sometimes: happening to be in a lawyer's office the other day, the conversation turned on the varied information which his regular practice often compelled a lawyer to acquire; in evidence of this he produced the photograph from which our reproduction is made, with the explanation that business had recently called him to Trinidad to consult about a certain asphaltum mine, and as a souvenir of his visit he had had the view taken. We thought at the time that our readers might like to see what an asphaltum mine looked like, and made a mental note for future use. Very few days after this we came upon the account in the New York *Times* of a similar visit to this mysterious and seemingly inexhaustible provision of nature, and at once saw the chance of putting two and two together. As both picture and narrative have a picturesque as well as practical value, we trust that others will be pleased that the coincidence occurred.

ST. JEAN DES VIGNES, SOISSONS, FRANCE.

Of this ruin, the Abbey church, once dedicated to St. Jean des Vignes, Mr. J. F. Hunnewell says in his "*Historical Monuments of France*," "the massive front of which, with two great towers that bear high open spires, is nearly all of the monastery spared by the destroyers during the first revolution. The townspeople then succeeded in preserving the grand fragment, still the most imposing object in Soissons. It is now kept in good repair, and parts, indeed, have been restored. The lower portions are light brown; the spires and upper parts have grown gray by long exposure. The two towers are of the thirteenth century: the spires were added afterwards. The style is early Pointed; the design is regular up to the base of a great central gable. There are three large portals; as is usual, all is boldly decorated. In the centre of the front, above the middle door, there is, much in the English manner, a great Pointed window, broad and high, from which the tracery has been broken. The southwestern tower and spire are lower and more simple than the northern. The latter can be ascended by a stone stair."

A FIREPLACE IN AN ENGRAVER'S STUDIO. AFTER AN ETCHING BY ROCHEBRUNE.

[From the Moniteur des Architectes.]

COTTAGE FOR MRS. J. W. JOHNSON, GERMANTOWN, PA. MR. LINLEY JOHNSON, ARCHITECT, PHILADELPHIA, PA.

STORE AND APARTMENT-HOUSE FOR MRS. ANNA B. PECK, CHICAGO, ILL. MR. JOHN ADDISON, ARCHITECT, CHICAGO, ILL.

"THE JOURNEY TO THE BRIDGE OF CE." — "THE CONCLUSION OF PEACE," AFTER ENGRAVINGS OF THE OIL PAINTINGS BY PETER PAUL RUBENS, NOW IN THE LOUVRE.

See article on "Mural Painting" elsewhere in this issue.

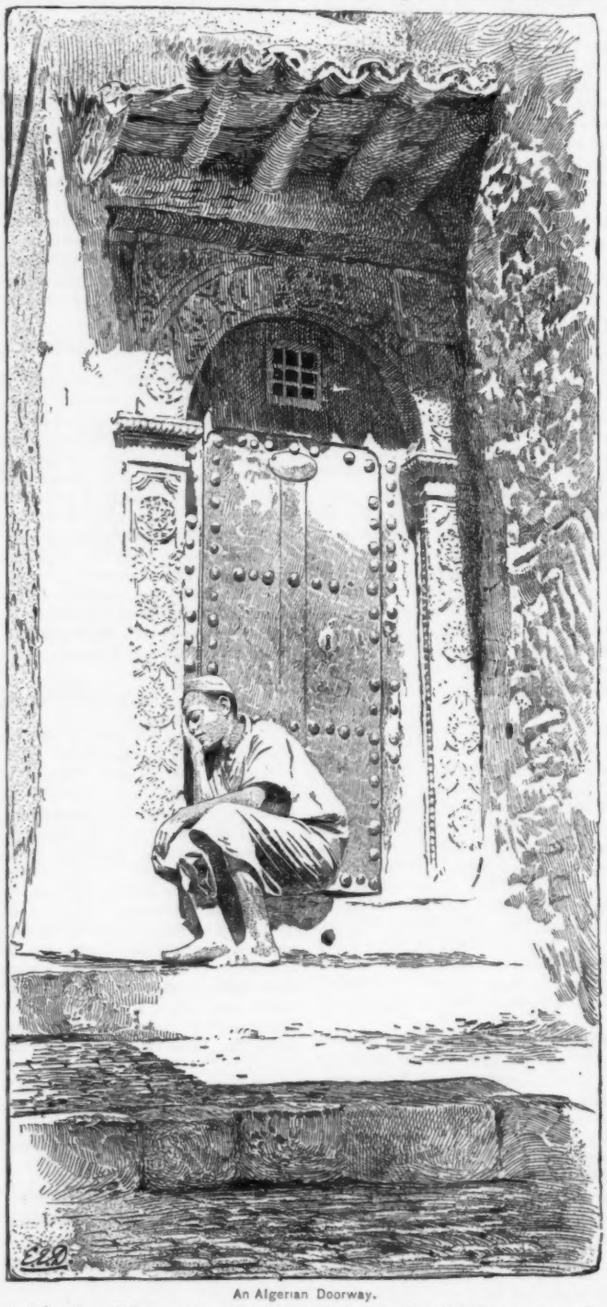
TRINIDAD'S LAKE OF PITCH.

Mask in the Vestibule of the Grand Opera House Paris.

I DOUBT whether many people know that a large share of the asphalt pavements they walk over is made from pitch brought from a natural pitch lake on the island of Trinidad. This lake is only a short distance from the sea, and the pitch oozes out of it and runs down the hill, and forms great pitch reefs that look like low black rocks. One of the largest of these reefs has been almost cut away, and the pitch carried off in vessels that came from New York, whither it was taken to be made into pavements. In writing a description of this black lake, I must begin honestly by saying that I did not see it. It is some distance down the coast, and then some distance inland, and a visit to it requires at least two days. My time in Trinidad was too short to permit me to make this trip, but I did the next best thing, and learned all the facts about the lake that I could from a gentleman who is thoroughly familiar with it.

"It is just what its name implies, a lake of real pitch," said my informant. "It covers ninety-nine acres."

"The easiest way to reach it," he went on, "is to take a sail-boat and go down the coast southward about thirty-five miles. Then, you land at the pitch point, La Brea. The first time I went there (and it is just the same now), I found the beach black with pitch. The wind nearly always blows off-shore at that point, and carries with it a smell of asphalt. Instead of the usual pebbles of stone, the pebbles on the beach were little balls of pitch. There were pools of water inclosed between the walls of hardened pitch. The soil, when we left the beach, was about half pitch and half rich earth, and the pitch oozes out in little half-liquid streams. The hot sun of this climate keeps it always soft and it is never still. In the heat of the day, from expansion, it spreads; the cooler night causes it to contract again, so it is always in motion. There were the remains of some cottages there that had sunk so far in one place and another that they had dropped to pieces. A house built of any heavy material like stone or brick would not stand there at all, so they are all made, of course, of wood, and put together so that they will stand the strain if one end happens to sink a foot or two. It is not, as you may imagine, an encouraging place to build a nice house — and there are no nice ones there. But the soil is as rich as any you would want to see, and between the lake and the sea, where it is about half pitch and half clay, everything grows luxuriantly. Plants do not grow actually in the pitch, but wherever there is a little soil, the pitch does not seem to hurt them at all. La Brea is a great place for pineapples, and they grow there larger and sweeter than any place else I know of.



An Algerian Doorway.

"I could have got a clumsy cart at La Brea," he continued, "but preferred to walk, as it is only a short distance, and by walking I saved myself a hard jolting and had a better chance to see the country. There was a fairly good road up to the lake, made of the pitch, which has been put there for the convenience of the ox-carts that carry pitch down to the coast. But this has to be renewed often, for the pitch gradually works itself down the hill and into the water, where it cools off and hardens into reefs. The lake is about one hundred and fifty feet higher than the sea level. The farther up the hill I went the more pitchy everything became. I soon reached a broad plain of pitch where the vegetation was very scant. The ground looked almost as if it had been paved with asphalt. But the lake is not visible from this plain, being farther up the hill. It was hard and hot work climbing the hill under the burning sun, stepping occasionally into a soft spot where the pitch stuck to my shoes, and very often going over my shoe-tops in dirty water, for the ruts in the road, after filling with water, are covered with the brown pitch dust, and it is almost impossible to see them. But when I did get to the top of the hill and had a view of the lake I was paid for all the trouble. It was not in a hollow like a lake of water, as I expected to find it, but at the top of an elevated place. On two sides the surrounding land is higher than the lake and on the other two sides it is lower. It was more of a sight than I had any idea of finding. I expected to see the lake covered to some depth with earth, so that they would have to mine out the pitch. But it was not. It was a perfectly black and bare pool of partly hardened pitch that glared in my eyes as the sun shone upon it. There was a number of islands, I should think about fifty feet across, scattered about the centre of it — islands of earth with vegetation on them. On the opposite side a fine growth of palm trees."

"Did you walk out on the lake?"

"Yes. I was a little shaky about it at first, for it looked as if it might stick me fast. I was alone, and if I got stuck there was nobody to pull me out. I tried it gently at first, and, finding it would hold me, ventured to walk out. I had not gone far before I came to a long, narrow pool of clear water, with some small fish swimming in it. Somebody had left a plank lying here (for I was following the dim outline of a path over the lake), and I made a bridge of the plank, crossed over the pool, and went on. But before I went far I came to another pool. There was no plank there so I sprang over it, and shortly afterward came to a third pool. The lake was seamed with little streamlets of clear water. I jumped over the third one and saw more pools all about me. I can hardly describe just how they were, but Kingsley gives a good description of the lake, and tells how these pools intersect each other. I have his '*At Last*' in the house; let me get it and read you what he says about the streams of water."

When my informant returned he read me this from Mr. Kingsley's book:

"Conceive a crowd of mushrooms, of all shapes, from ten to fifty feet across, close together, side by side, their tops being kept at exactly the same level, their rounded rims pressed tight against each other; then conceive water poured on them so as to fill the parting seams, and in the wet season, during which we visited it, to overflow the tops somewhat. Thus would each mushroom represent, tolerably well, one of the innumerable, flat, asphalt bosses which seem to have sprung up each from a separate centre, while the parting seams would be of much the same shape as those in the asphalt, broad and shallow atop, and rolling downward in a smooth curve till they are at the bottom mere cracks from two to ten feet deep. Whether these cracks actually close up below, and the two contiguous masses of pitch become one cannot be seen. As far as the eye goes down they are two, though pressed close to each other."

"That," he continued, "is a much clearer description of the surface of the lake than I could give you. The detached circles of

pitch do look just like mushrooms, and the spaces between them are filled with clear water; not only in the wet season, as Mr. Kingsley says, but all the time, as I have since learned. In the wet season the water is higher, but the cracks between the circles are never entirely dry. I call them circles for convenience, but they are in almost every conceivable shape. One of the most curious things about the lake is the fact that many detached pieces of wood seem to be floating in it. They come up from the pitch at places far removed from any trees, pieces generally about the size of a cord-wood stick, four or five feet long, and sometimes five or six inches in diameter. They come through the surface end first, leaving a foot or two sticking out, so that they look just like stumps of trees that have been burned down. They look all the more like burned stumps, because, in coming through the pitch, some of it sticks to the end and blackens it. I had heard before I visited the lake, that pieces of wood were frequently found in it partially turned into pitch."

"What do you mean by 'partially turned into pitch?' How does a piece of wood look (if you have seen any) when it is in the transition state?"

"I have since seen a large number of such pieces; indeed, I found one or two on my first visit. The sticks look very much like a piece of badly-charred timber, where part is wood and part charcoal. Only, in this case, the charred part is softer than charcoal, and may easily be impressed by the fingers. However, as I was saying, I made my way, sometimes by the use of more planks that I found, sometimes by jumping, to the islands in the centre of the lake. There were no high trees on them, but a great many low shrubs. It is not worth the trouble of going out to the islands, and I would not tire my muscles with leaping over the water-pools again, but of course I wanted to see them on my first visit. Their soil is very much like that between the lake and the coast — part pitch, part clay. It is said that these islands shift about, changing their position, number and size, but I have visited the lake a number of times since, and have never been able to see any alteration in them. If they change at all, it must be very slowly. They had told me at La Brea that beyond the islands was a spot where the pitch was soft and still oozing up from beneath. They said I would know it by the white and yellow sulphur, which there is very abundant. They might have added that I would know it by the smell. You might take a dozen asphalt pavements and melt them all down in a close room, and you would have something like it. I rather like the smell of an asphalt pavement, but this was too strong, and almost made me sick. The water between the circles of pitch was a dirty yellow, with sulphur foam; and from both pitch and water bubbles of gas were constantly rising, which smelled very bad. The pitch here was soft. Wherever I stepped, I left the impression of my shoes. It was about like an asphalt pavement on a very hot day. Some of the workmen engaged in getting out pitch have since told me that they have stood in one spot there till they were ankle-deep for an experiment; but that would be dangerous to try without some one at hand to give assistance in case of getting in too far, so I did not try it. Old accounts of the lake say that a man, by standing in one place for some time will, with his weight, make a circular depression, like a great basin, several feet in diameter. But that is not so now. Perhaps the pitch has hardened since those accounts were written. I saw, however, the fresh pitch coming out between the circles in considerable quantities. I had been told that I could put my hands into this fresh pitch without any of it sticking to them, and I found that this was true. I washed my hands in it, and they came out with nothing but the muddy water on them. I think, however, that it was on account of the mud and water that the pitch did not stick. All the fresh pitch comes up through the crevices that have mud and water in them, and, before the hands can reach the pitch, they are wet with the mud and water. If some of the pitch were taken out, I think it would stick to the hands like any other. The quantity of soil mixed with it undoubtedly injures its sticking properties, just as it depreciates its commercial value. If the pitch were chemically pure, without any earth mixed with it, I think I should be living just now in the best house in the city."

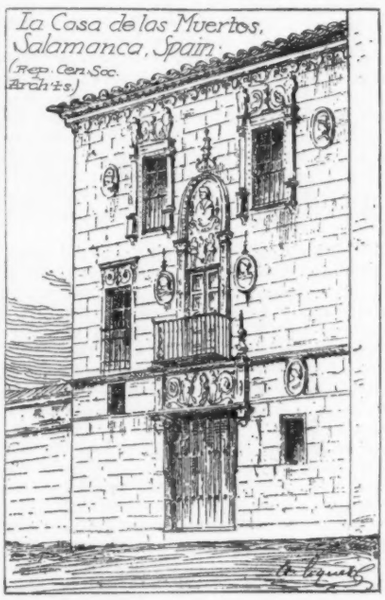
"Were any of the pitch circles movable? Could you make them vibrate?"

"Some of the smaller ones. I found several that looked, as Mr. Kingsley describes, just like mushrooms. They were spread out wide at the top, but supported by a thin stem not more than a foot in diameter. This gave them, when closely examined, very much the appearance of a small stand with a single central support. The tops of some of these were as much as four or five feet in diameter. I stood on several of them and found that they sustained my weight (nearly two hundred pounds) without difficulty, and that I could rock it from side to side. I tried the experiment I had often read of — breaking off a bit from the edge and dropping it into the water. It sank immediately, showing, of course, that the pitch does not float up from beneath on the water, but that it is forced up by some pressure. I can tell you pretty exactly what proportion of earth there is in the pitch, for it has cost me a good deal of money to find it out. It varies in different places between twenty and thirty per cent, and will average about twenty-five per cent. That does not impair its value for making asphalt pavements, in which earth and sand are always mixed with the pitch, except in increasing the cost of transportation, which is considerable for such long distances. What is taken out nearly all goes to New York or to Paris. It was thought at one time that the pitch reefs under water would be free from earth from the constant washing of the waves; but it was found to be just the same as that in the lake, for the cool water hardened it almost immediately and prevented the earth from escaping. It has to be purified before it can be used for calking the seams of ships and such purposes. I brought away some samples of the pitch with me, both hard and soft, taken from various parts of the lake, and sent them to New York to be analyzed. Afterward, being satisfied with the result, I sent several cargoes of it up, and always managed at least to get my money back. But, as a speculation, I do not think it offers very dazzling inducements. I regard the lake as one of the greatest natural curiosities I ever saw. Now I have given you an account of my first impressions of the lake, and I have not seen anything since to change them. My later experiences with it have been chiefly of a business kind. In going back I deserted the lake and skirted its shore, where the walking was easier."

"Has any one ever been caught and engulfed in the pitch?"

"There are stories of that kind, but I have not been able to authenticate any of them. The negroes in the neighborhood are afraid of the lake — have a superstitious dread of it. So have the Indians. There is a legend among the latter that the land now covered by the lake was once well-tilled ground, but that the people living on it offended some of their guardian spirits, so their houses sank in a night and the site was covered with this pitch. They still have stories of people sinking in it, but I think they are no more probable than the legend. The nearest I could get to authenticating any of them was, that a colored man started out from La Brea one night to visit a neighbor, his route taking him across the lake, and that he never returned, and was supposed to have sunk in the pitch." — *W. Drysdale, in the New York Times.*

CONCRETE.[1] — I.



I HAVE to-night to ask your attention to the means to be adopted for rendering buildings stable, and securing good foundations. This question of foundations is perhaps the most essential of any with which persons connected with buildings have to deal, for if the foundation be faulty, the superstructure, even if it should stand, will certainly suffer. It will be totally useless for the architect to design, or for the deft fingers of the mason to elaborate the most delicate window-tracery, the most graceful piers and columns, the most stately towers and domes; or for the artist to enrich these creations with the most brilliant efforts of his genius, unless the edifice be founded so that no cracks or settlements occur to deface the decorations. In some localities, as, for instance, where rock crops up close to the surface, a natural foundation is obtainable which cannot be improved upon, but in the majority of cases, and especially in London and its neighborhood, it is almost impossible to find a good natural foundation without digging to a depth that is practically out of the question on the ground of expense. Hence, it is necessary to form artificial foundations, and the material principally used for these is concrete.

Although the use of concrete as a building material is of comparatively recent date in this country, it was known and extensively used by many of the nations of antiquity. There is ground for thinking that the Greeks were not unacquainted with its use, especially in the Italian colonies of Magna Græcia, and, as far distant as Mexico, in many of those curious pyramidal buildings which are the remains of an unknown civilization, concrete foundations have been discovered. But when we come to those grand old builders, the Romans, who were, *par excellence*, the scientific constructors and engineers of ancient times, we find that they used concrete to an extent with which nothing that has as yet been done in modern times can compare. One reason for this was that the Romans found ready to their hand the best natural materials that exist in the whole world for making good concretes, viz., the Travertine limestone, the pozzolana, which is a fine sandy earth of volcanic origin, and a beautiful, clean, sharp sand. The use of concrete by the Romans dates back as far as the time of the kings (*i. e.*, anterior to 509 B. C.), and no less than five kinds of concrete walls are described by Mr. Middleton,

[1] By Mr. John Slater, B.A., being the fifth of the present course of free lectures to artisans at Carpenter's Hall, London, delivered on March 17.

who has recently devoted a great deal of careful attention to the methods of construction of the Romans. In addition to using concrete for foundations they used it without any facing for walls, which were constructed very nearly as described in Mr. Tall's or Mr. Drake's patents which were taken out a few years ago. Wooden posts were fixed in the ground about three feet apart, and boards were nailed horizontally to the posts, and then the intermediate space was filled in with concrete in a semi-fluid state, and, as soon as this had set, the boards were moved one stage higher. Thus the concrete formed one perfectly solid mass, and some of these early Roman walls are so solid and hard still that quite recently it has been found necessary to destroy them with dynamite in the course of improvements that have been made. Even when the Roman walls appear to be of brick or marble this is in every case a mere facing or veneer, and the core of the wall is of concrete. They also largely used this material in constructing very extensive vaults supporting upper floors, staircases, ranges of seats, etc. Concrete also formed the basis of all the Roman roads, and in the early examples the blocks of stone laid on the concrete were much more closely jointed than was the case afterwards. There can be no doubt that the lasting nature of the Roman concrete was due, in addition to the excellence of materials, to the careful way in which it was made, and I shall have to refer again to the method of making concrete adopted by the Romans. The French have been very great users of concrete, or *béton*, as it is there called, since the year 1820, and the material has been used in enormous blocks in docks at Toulon, Marseilles and other places, and in the construction of the mole at Algiers and the breakwater at Cherbourg. In this country concrete was employed in very early times, as, for instance, in the foundations of Westminster Abbey and in the older portions of the substructure of St. Paul's; but its use died out, and for a long while the only method adopted for making stable artificial foundations in bad soils was pile-driving. Although Mr. Semple, of Dublin, in 1876, suggested the use of a mixture of sand, gravel, and quick-lime for structural purposes, it was not till the beginning of this century that concrete was recognized as a building material. Colonel Pasley says that the first use of concrete for foundations was by Mr. Smirke at the Millbank Penitentiary in 1817, and there is a story that the discovery, or rather rediscovery, of the fact that lime would combine with gravel and form a sort of artificial stone, was a pure accident, owing to the upsetting of a barge-load of lime during the erection of Waterloo Bridge, when it was found that the loose gravelly bed of the river had been rendered hard and compact by the action of the lime.

Now, what is concrete? It may be defined as an artificial stone, composed of a mixture of hard materials, such as ballast, flints, stone-chippings, broken bricks, pottery, or iron slag, called the "aggregate," and a cementitious material called the "matrix," thoroughly combined together with a sufficient quantity of water. The value of the concrete depends almost entirely upon the quality of the cementitious material, whether lime or cement, and as it is most important that you should clearly understand the difference in the properties of various kinds of lime, I must make a short digression here in order to describe them.

You are, of course, all aware that lime is produced by burning limestone, and upon the constituents of the limestone depends the quality of the lime. First, there are the rich limes produced from stones which are perfectly pure carbonate of lime, such as the upper and middle chalk formations and white statuary marble. Lime made from these stones is commonly called chalk lime, and is much used for mortar and concrete in country districts where chalk is plentiful. This lime when mixed with water commences to slack, as it is called, *i. e.*, it swells, hisses, gives off hot vapor, and falls into powder, and if it be then mixed with water it will always remain of the same consistency and never harden at all; and as it is soluble in fresh water, mortar made of chalk lime should never be used for external work, as the action of the weather will soon render the joints quite soft; and any one who has been present during the pulling down of buildings, the mortar of which was composed of chalk lime, will have noticed how easily the bricks are separated, and what a large amount of dust comes from the demolition. Then come the poor limes made from the argillaceous or clayey limestones, which contain, in addition to the carbonate of lime, various foreign substances, chiefly silica and alumina, and often a small quantity of oxide of iron. The existence of a small quantity of these foreign substances — as in the Dorking, Halling, and Merstham limestones — causes the lime made from them to show much less violent action when slacked, and enables it to set after slacking, but not under water. Next come the blue lias limestones, which contain a greater quantity of silica and alumina, and produce what are called hydraulic limes, which will set and continue to harden under water; and after these come the so-called natural-cement stones found in the London clay formations at Harwich, Sheppy, and the Isle of Wight, or imports of Yorkshire in the clays of the oolitic series. These contain even more silica and alumina, and from them used to be manufactured the Medina and Roman cements, which had the power of hardening under water very quickly. These cements enjoyed a high reputation for many years, but they are now almost entirely superseded by the artificial cements of which Portland is a type. You may take it roughly that rich limes contain over ninety per cent of carbonate of lime; grey-stone limes, such as Dorking, about eighty per cent; blue lias from sixty-six to seventy per cent; and cements forty to fifty per cent.

When it was a well-ascertained fact that for building purposes lime obtained from the limestones containing a considerable proportion of argillaceous earth was the best, the idea began to gain ground that an artificial cement could be manufactured by mixing chalk with various kinds of clay, and calcining the mixture. The first patent ever granted for the manufacture of an artificial cement of this kind — called Portland cement from its resemblance when set to Portland stone — was taken out by a Mr. Aspden, in 1824 (who describes himself as of Leeds in the county of York, bricklayer), but the manufacture was not placed on a really scientific basis till Colonel Pasley carried out his elaborate series of experiments during the years 1826 to 1836. As so often happens with scientific discoveries, it appears to have been by pure accident that he discovered, after many failures, the superlatively good qualities of the alluvial clay or mud of the lower basins of the Thames and the Medway; this clay, which has been deposited in the tidal waters of these rivers, containing exactly the right proportions of silica and alumina for combining with the chalk. It would take too long to describe in detail the manufacture of Portland cement, but briefly it is this: the chalk and clay, in the proportion, as a rule, of about seventy per cent of the former to thirty per cent of the latter — though these proportions vary with the nature of the chalk — are ground under rollers and intimately mixed together with a great quantity of water until the mixture is of the consistency of thin paste, which is allowed to settle. The water is drawn off, and the residue is left to dry. This is then cut out in lumps and taken to the kilns, when it is burned at a high temperature, and it is very important that the whole of the mixture should be thoroughly burned. The effect of the burning is to drive off all the carbonic acid gas, and to leave the mixture in the form of clinkers. These are then carefully ground to a powder under millstones to such a degree of fineness that it will all pass through the meshes of a sieve having six hundred and twenty-five holes to the square inch. The weight of the ground cement should be as nearly as possible one hundred weight per striked bushel, and the specific gravity 3.00. The essential difference between lime and cement is that lime slacks with the addition of water, while cement does not. Lime powder after slacking will not set if mixed up with water, unless sand be added to it, while cement will set at once, and equally well in the water and the air. The property of setting quickly, and setting under water makes Portland cement of the greatest value, and its use for concrete is extending every day.

Now with regard to the aggregate. This may consist of ballast, stone chippings, broken bricks, etc., but the latter should never form the whole substance of the aggregate, and care should be taken that the pieces are not too large. In the case of ballast, it is most important that it should be clean and free from any admixture of loam or earthy substance. And there is one other point to be remembered, which is, that the concrete will be much stronger for the admixture of a small quantity of sharp sand, which will fill up the interstices between the pebbles, etc., and will make a much more solid mass of the whole.

Having thus described the materials of which concrete is composed, I now come to the mixing process, and this is a matter which is far too often neglected. We all know the good old rule-of-thumb way in which ordinary builders' laborers mix up the concrete: a heap of ballast and broken bricks is piled up, a certain, or rather very uncertain, quantity of lime is poured out on it from a sack, the water is added according to the discretion of the mixer, and the mass is quickly turned over, and wheeled and shot into the trench, and a very superficial examination is often sufficient to show numerous nodules of unslacked lime after it has been thrown in. Now this is a most unscientific and improper way of preparing concrete: the great essential is that the lime should all be perfectly slacked during the mixing of the concrete before it is thrown into the trench, and that exact proportions should be maintained.

For ordinary foundation purposes, if what is called stone lime be used, two measures should be prepared, the cubical contents of the one being four times that of the other. The large measure should be filled with ordinary ballast, and turned out on a boarded platform; to this should be added a small measure full of sand, and then a small measure full of lime: this will give the proportion of five parts ballast and sand and one of lime, and if this be well mixed and turned over after the water is added, which should be done gradually and in small quantities, it will make a very good concrete for ordinary purposes. If the ballast and sand, before the admixture of the lime, amount to a cubic yard, it will be found that about thirty gallons of water will be required to mix it thoroughly. This mixture should be then wheeled and thrown into the trenches — not from a great height, as used to be considered essential, for, if so, the heavier particles tend to fall to the bottom first, and the mixture will not be so well amalgamated — levelled and rammed. The French method of making concrete, or *béton*, which is almost exactly the same as that adopted by the old Romans, is undoubtedly superior to ours. They invariably mix up the lime and sand to form good mortar *first*, and then mix in the pebbles with it. A heap of good stiff mortar is first prepared with a moderately hydraulic lime and sharp sand; a barrowful of pebbles, which have been washed, is then spread out on a platform; over it is spread a barrowful of mortar, then a second barrowful of stones, and then another of mortar, and the whole is turned over with spades and dragged backwards and forwards with rakes till the pebbles have become thoroughly enveloped in the mortar, and the whole mass is then thrown into the trenches. An extra

precaution against deterioration of the concrete by contact with loamy earth is adopted in the best work by covering the bottom of the trench with another layer of sharp sand. The washing of the ballast is an excellent thing, as it tends to clear it from any earthy particles that may have become mixed with it. There can be no doubt that this is a far more scientific method of making concrete than the former; if the mortar is well made, you get the pebbles more thoroughly amalgamated, and you ensure that the lime shall be thoroughly slacked before the concrete is spread; but it is also more expensive, and I should not consider it necessary to use this method in ordinary cases. But where the soil is very wet, or in any case where the stability of the foundation is of very great importance, I should always recommend the use of cement concrete. With ordinary care in mixing this, supposing the materials are of good quality, you know you can rely upon its setting quickly and forming a perfectly solid foundation, and you need be under no apprehension of having it spoiled by the inroad of water. The cost is more than that of lime concrete, but not so much more as the difference in cost of lime and cement, because you can use less cement proportionally. Six parts of ballast, one of sand, and one of Portland cement will make a concrete good enough for almost anything in the way of foundations. Care should be taken that not too much water is used. Faraday, the eminent chemist, said that in the production of concrete the great thing was the discreet and accurate use of water: if too much be used it will wash the cement away from the particles of the mass before it has time to become thoroughly indurated. If the trench in which the concrete is to be spread is not too deep — that is, not above eighteen inches — my own opinion is that you will get a harder and more solid mass by filling it up at once to the full thickness, and not putting the concrete on in layers: but if you have to put the concrete five feet thick, it must, of course, go on in layers. In any case, it will be much improved by being well rammed after levelling. In such a material as concrete there must be a large number of minute air spaces — you can see them with the naked eye in concrete that has set — and the act of ramming will drive out much of the interstitial air and make the particles of the mixture more compact, and the denser such a material is the stronger it is. Numerous experiments have been made to ascertain the loss of bulk in making concrete. Professor Hayter Lewis found that twenty-seven cubic feet of Thames ballast mixed with four and one-half cubic feet of lime and forty gallons of water, made exactly one cubic yard of concrete; and in some tests made by the Royal Engineers, it was found that twenty-seven cubic feet of broken stone, nine cubic feet of sand, four and one-half of Portland cement, and twenty-eight gallons of water exactly made a cubic yard. The difference between the two experiments may be accounted for entirely by the presence of the sand in the latter case, because the probability is that if a measure containing a cubic yard were filled with broken stones or ballast, it would still hold eight or nine cubic feet of fine sharp sand, because the pebbles will not lie close. It is sometimes stated that concrete expands after being mixed; if it does it is because it has been improperly mixed, and any expansion that takes place after mixing can only cause some disintegration to take place.

[To be continued.]

BOOKS AND PAPERS.

AS we recall the eager expectancy with which we rummaged in boyhood amongst the contents of the paternal library, more rich in books of theology and philosophy than in works of fiction and the imagination, we picture the delight with which we might have found — as we hope the boys who are coming after us and are now upgrowing actually will find — stored on a topmost shelf such a collection of standard works as that which Messrs. Cassell & Company are now publishing in such good style and at such an extraordinary price in their "*National Library*."[1] The gormandizing days of boyhood are the proper time, we find, to thoroughly enjoy those minor English classics which every one knows by name, but which one does not, later in life, find time to take up, nor to thoroughly enjoy if he do, as we found when for the first time we had, last night, the opportunity of running through Horace Walpole's "*Castle of Otranto*," as familiar by name to all readers, as Walpole's fantasy at Strawberry Hill is familiar to all architects. Silvio Pellico's "*Ten Years' Imprisonment*" brought back, when it came to hand, long-forgotten associations with Sunday reading and Sunday-school lessons, just as the "*School for Scandal*" and the "*Rivals*" revived recollections of college theatricals. The feeling excited by the "*Autobiography of Benjamin Franklin*" were most akin to those we have felt as the victim of an April fool's day hoax, for we were chagrined to find ourselves so uninstructed in polite literature as to be surprised when we found that the "*Autobiography*" was brought to an untimely end at the close of the author's fifty-first year, just as he was entering on his brilliant European career. Henry Mackenzie's "*Man of Feeling*," to which has been prefixed by the editor an "Index to Tears (chokings, etc., not counted)," which gives a key to forty-seven lachrymose passages, we have not found time to read, but we have, in turning over the pages, found one or two passages where the Man of Feeling "pipes his eye," which have escaped the editor's enumeration. After we have read this mournful tale, we expect to be in the proper frame of mind to attack the many volumes of "*Clarissa Harlow*," which for the last score of years we have always "meant to read." "*The Voyages and Travels of Sir John Maundeville, Knight*," who, in the fourteenth century, travelled, in the fear of God, through the East, is a refreshing tale to the modern reader who knows his geography, theology, zoology, ethnology, sociology, and all that, and who will find his respect for Prester John much like that he entertains for Pope Joan. Still the tales of magnificence told by this simple traveller have the power to stir the smouldering embers of romantic belief. Hugh Latimer's "*Sermons on the Card*" we treat with the respect due to his great name and his sturdy steadfastness, but we beg to be excused from following his discourses, because — well, we will say because it is humiliating to find how much of one's Latin can be forgotten, and it does not seem to be quite fair to read the reverend gentleman's sermons unless one can follow the thread of his discourse when he frequently lapses into a form of speech more familiar to monks than editors.

Though we know something of the cost of manufacturing books, we find it none the less extraordinary that the publishers are able to sell such extremely creditable booklets for the price they have fixed. If five dollars can bring into a man's hands fifty-two complete, neat, wholesome standard works of the minor-classic type, we think he must be a very narrow and one-idea man who will let the chance pass by. For our own part we are extremely grateful to the publishers for sending them to us, and we look to being able to pick up many dropped literary stitches in this way, and receive both instruction and enjoyment while so doing. With one hundred dollars in hand, think what a library a man can nowadays place on his shelves, thanks to such publishers as Bohn, Tauchnitz, and now the Cassells, and their editor, Professor Morley!

[1] "*Cassell's National Library*," Edited by Prof. Henry Morley. Ten cents per copy, five dollars per year. New York: Cassell & Company, 1886; "*Childe Harold's Pilgrimage*," by Lord Byron; "*Autobiography of Benjamin Franklin*"; "*My Ten Years Imprisonment*," by Silvio Pellico; "*The Rivals and a School for Scandal*," by Richard Brinsley Sheridan; "*The Man of Feeling*," by Henry Mackenzie; "*Sermons on the Card*," by Hugh Latimer; "*The Castle of Otranto*," by Horace Walpole; "*Voyages and Travels of Sir John Maundeville, Knight*."

COMMUNICATIONS.

[*We cannot pay attention to the demands of correspondents who forget to give their names and addresses as guaranty of good faith.*]

WAS THE ROOF OF SOLOMON'S TEMPLE FLAT OR SHARP?

To the Editors of the American Architect:—

Dear Sirs,— The Hebrew term for roof is *gag;* and the Greek for this, in the Septuagint, is *doma*. Now, if we could show that these words both mean a flat roof — in and of themselves have this meaning — we should think that our question is at once answered. But the fact is, that it is nowhere stated, in the Scriptures, that either the temple or capitol had any roof at all, whether flat or sharp. So the first question is, Had these buildings any roofs? They both had windows; for this fact is so stated in words; and these would be of no use if there were no roofs. We know that the two buildings were similar to each other, and that the capitol, on its inside walls, was wainscoted "from the floor clear up to the floor," which can only mean that the walls were sheathed from floor to roof — from the horizontal flat floor below to the horizontal flat roof above.

The twice-three watch-towers at each one of the twice-three gates of the temple's courts had windows; and hence we know that they had roofs: but we are *told* that they had roofs (*gag*, Ezekiel xl. 13). Now symmetry requires that the temple should also have a roof (*gag*) — a flat roof; not a sharp one.

Columns are mentioned as on the inside of the temple; and these imply a roof to be supported. The Talmud speaks of the "roof" of the temple by name, and Josephus tells us of the "top" of the temple.

That the roof of the capitol was flat we have already seen indicated, by the term "floor," which is applied to it: it was a floor overhead — indeed, was used as a floor, as we shall soon see. Just so a "threshold" below and a "lintel" above are both called *saph* in the Hebrew of Ezekiel xl. 6, because a threshold and lintel are so much alike. So, too, the Hebrew for the "thumb" of the hand and "great toe" of the foot is the same word.

As for the roof of the temple, it must have been flat, because the house, that is, the temple, was thirty cubits high. It is not said that it was thirty cubits high at one point or on one line, as at a ridge-pole; but thirty cubits high, that is, wherever the measure be taken. It was thirty cubits (45 feet) high over the nave, certainly; for so it is stated; and the heights of the walls of the galleries and foundation give a height of thirty cubits at the eaves; and hence, again, the roof must have been flat.

In the Talmud the temple has a battlement; and a battlement (in Deuteronomy xxii. 8) was to keep people from falling from the roof (*gag*): people on a roof imply a flat roof.

The three thousand men and women on the roof (in Judges xvi. 27) imply a flat roof. So do the booths on the roof (in Nehemiah viii. 16); and David's walking on the roof (in 2 Samuel xi. 2): compare Joshua ii. 6; 1 Samuel ix. 25; 2 Samuel xvi. 22, etc.

There is nothing said about a roof, in the Scriptures, implying a sharp roof: a flat roof is often indicated.

We have no right to put a Grecian or other sharp roof of the West on the flat or partially dome-roofed houses of the East.

But what makes it certain that the temple had a flat roof is this: that the height over the floor of the nave and oracle, in one measure, is given as thirty cubits (45 feet), and the several wall-heights (5 + 5 + 5 + 5 + 10 cubits = 30 cubits = 45 feet) added together make thirty cubits at the eaves all round the four sides of the house.

Water will run from a roof paid over with pitch, and made as flat as any good workman would be likely to make it. It requires the greatest possible mechanical skill to level a billiard-table. But the flat portions of the roofs in Palestine slope slightly; we can see how much they slope by looking at photographs of roofs in Jerusalem.

P.

TOPPING-OUT CHIMNEYS.

To the Editors of the American Architect:—

Dear Sirs,—In topping-out chimneys with a drawn-in top, does the brickwork need to be eight inches thick above roof, when it is four inches below? For instance, such a one as is in the last number of the *American Architect* (No. 538), by Messrs. Chamberlin & Whidden's design.

M. F. D.

[We hope that if the chimneys referred to have eight-inch walls above the roof, they are equally thick below it. If our correspondent means to ask if a chimney-top can be drawn-in when only four-inch brickwork is used, we will say that a good bricklayer will have no trouble in doing it.—Eds. American Architect.]

THE BEST KIND OF DRAIN-PIPE.

Portland, Oregon, April 13, 1886.

To the Editors of the American Architect:—

Dear Sirs,—Will you kindly answer the following questions:

For house-drainage and street-sewerage, which of the two, glazed terra-cotta or cement pipes is most used, and which of the two is prefered as to sanitary reasons? If the preference is for cement pipe, what is the composition of the cement pipe.

Yours respectfully, W. H. Williams.

[Salt-glazed Akron sewer-pipe is unquestionably the best from every point of view. Cement pipe has so often proved unsatisfactory that it would be advisable to use it only when the Akron pipe can not be had. Slip-glazed pipe should also be avoided.—Eds. American Architect.]

NOTES AND CLIPPINGS

The Chicago Board of Trade Clock.—The works of the immense clock which has been put up in the Board of Trade Building in Chicago are pronounced a most perfect reproduction of those of the great Westminster Palace clock in London, but with some additions and improvements adapted to its commercial purpose. It is constructed of iron, bronze and steel, and weighs ten tons without the bell, the latter adding some 4,500 pounds. The pendulum alone weighs 750 pounds. In its arrangement the works are divided into a time-train, a hand-train and a striking-train, these several trains comprising separate machines, resting side by side on separate frames. Each of the trains is operated by a separate weight, and the three weights together reach some 3,500 pounds. The hammer that strikes the bell weighs some eighty pounds, the clock-work is below the dials, which are ten feet ten inches in diameter, and the bell is above them, or 250 feet above the ground. The pendulum swings one way in two seconds.—*Exchange.*

Protecting the Ancient Monuments in Italy.—A bill concerning the protection of "historically and artistically valuable monuments, as far as such belong to the periods before the end of the eighteenth century," is before the Italian Parliament. Without using the words, a distinction is made between movable and immovable monuments. The latter, viz., antique temples, theatres, streets, houses, etc., are to be expropriated in such a manner that the Government pays for the ground and excavations, but not for the antiquities themselves. Movable antiquities, on the contrary, such as statues, cameos, etc., remain in the possession of existing owners, with the limitation that the Government has not only the first right of purchase, but the right to compel, if desired, the sale to it of the objects. In order to export antiquities, or to excavate, a duty of twenty per cent must be paid, and the consent of the Government obtained. Antiquities that have become the property of the State may not be resold.—*London Daily News.*

TRADE SURVEYS

The frequent complaints of unsatisfactory trade are offset by the comforting assurances of manufacturers, builders, projectors of engineering, and other enterprises of great activity. While retailers and wholesalers, including jobbers of products and merchandise of all kinds, are not meeting with that demand during the latter part of April, which they had expected, and to which they are accustomed, the manufacturers of machinery, engines, tools and equipments of various kinds, the builders or locomotives and of coastwise tounage, the builders of bridges and of railroads, are all meeting with an increasing demand for their services. A birds-eye view of the industries furnishes these salient features: First, that the general industrial condition is at about a stand-still; that within the past week or so numerous inquiries for material have been received; that two or three important railway enterprises have been put upon good financial footing; that the strikes are dying out and labor is generally at work. As to probabilities, the most noticeable are the expansion of demand in all trade circles, the improvement in orders for material at iron and steel works, in lumber, wool, coal and in general hardware and in agricultural implements. Consumers have preferred for the past month to buy cautiously, but are now evidently inclined to purchase more liberally. It is only necessary for one or two industries to make a start: a spirit of readiness exists and many others are ready to follow. Building enterprise has received a slight setback here and there, but a general summing up shows a healthy condition. The flood of permits and of projects and new enterprises of all kinds continues, the common-sense of the business and manufacturing public is leading the great body of the people steadily along in the pathway which was mapped-out last year. The manufacture of lumber so far this year has been carefully guarded, but with all there is an increasing consumption and stocks are declining in all primary markets. Wholesalers have, within the past week, endeavored to strengthen prices by a sort of informal agreement among themselves in New York and Philadelphia. If there is any actual improvement in prices, it has been made in hard woods. Furniture factories, sash, door, and blind factories, saw-mills, planing-mills and all wood-manufacturing and wood-working interests have been kept busily employed to meet the enlarging demand. In the department of bridge-building a great deal of activity is near at hand, and makers of bridge-iron, particularly in Pennsylvania, are in negotiation for unusually large supplies of material. Bridges are to be built across the Mississippi River at Winona, Minn., Red Wing, Minn., Keithsburg, Ill., near Alton, Ill., and as previously stated there are enterprises on foot looking to the construction of bridges at Cairo and at Memphis. Bridges are also to be built across the Missouri at St. Joseph, Saline City, Council Bluffs, St. Charles, Atchison, Chamberlain, Dak., and at Pierre, Dak., besides two or three other points. Bridges are also to be built across the Cumberland and Tennessee, and one across the Ohio at Cincinnati, besides numerous bridges over smaller streams, running from one hundred to three hundred feet in length. These favorable indications of activity are supplemented by the inauguration of railway-building enterprises and by the placing of a few large steel orders this week. Throughout the West building enterprise is at fever heat, excepting here and there where builders and projectors are waiting for industrial quietude. More or less enterprise is halting in St. Louis, and architects and building authorities there say that throughout the Southwest a great deal of temporary damage has been done, but that it is probable that lost time will be fully made up by midsummer. The labor disturbances there are practically over, and in all other localities disturbances are clearing up and everything points to the restoration of peace soon after May first. There is still the possibility of a general eight-hour strike on that day, however, but the best-informed authorities in the country do not regard a general unsettling for the reason that in most trades arrangements have been made as to the wages and hours of labor. The labor unions do not wish to precipitate a conflict, and will be content with what they have already accomplished. The semi-crisis through which we have passed, shows our strong foundations and will give greater confidence to capitalists in the future when industrial disturbances are threatened. The labor organizations are rising to a proper comprehension of the problem before them, and are proving that their leaders are fairly intelligent and conservative and not too inclined to lead their followers into dangerous paths. In commercial circles, the reports from all leading cities do not indicate the expected improvement. The volume of freight moving from Chicago eastward is exceptionally light. The westward business is correspondingly light. In banking circles, the moderate demand for capital is permitting a slight accumulation of funds, but nothing of a speculative character has been manifested. The possessors of capital, though responding quite liberally to the calls for money in the West and South, are still remembering the unwelcome treatment in the one section and the repudiating conduct of public borrowers in the other. It appears that in Michigan steps are to be taken to drive out Eastern capital on the extremely short-sighted plea that home capital can command higher interest. The West is what it is because Eastern capital has made it. Rapid as has been the development of the industries in the South, that section would have been much farther along had its political spokesmen insisted upon the honoring of all their obligations. Eastern financial centres are full of money, but strikes, the remembrance of repudiation, the disposition to tax what is called for in capital, and some other influences are making lenders extremely inquisitive as to all applications. There is an abundant field for idle capital West and South, and the investments which have been made within the past year or two are mainly turning out well. The building news for the past week continues to be of a very encouraging character. Efforts to gather information from some of the smaller towns throughout the New England and Middle States, ranging in population from 5,000 to 20,000, have resulted in showing not merely an ordinary but an exceptional activity in the building of houses for artisans, clerks and business men and manufacturers of small means. Throughout the West the building-loan-association plan is working steadily, and is accomplishing great results. It is finding a welcome in many smaller towns, and private capital is disposed to compete with it in the demand for house accommodation.

Prices of all kinds of products are likely to remain firm. Breadstuffs decline to weaken just at present; manufactured products will necessarily remain firm in price because of the greater control exercised by manufacturing combinations over supply. The outlook for the coming sixty days might be better, but considering the agitations to which the country has been subjected, the demand now coming in and the inquiries being made, and the evidences of activity manifested, all go to show the producers of values in every branch of activity that but little fluctuation of values is probable. The natural result of the unsettled trade conditions of the past few weeks is increased activity during the next two months. Manufacturers are increasing their capacity in nearly every branch. Iron and steel makers are putting up mills and furnaces; makers of saw-mill machinery were never busier; the same is true of wood-working machinery makers, and of makers of machinery in general. The failures for the past week show a slight falling off in number, and the loans of banks do not indicate any increasing demand for money in that channel.

Oiling Wood.—Wagon-makers or repairers can save their stock from worms by oiling with linseed oil. Singletrees, doubletrees, neck-yokes, spokes and cross-bars that are of white hickory, and are kept in stock for a year or more, will be eaten by worms if not kept in a dark place or otherwise protected. Coal and kerosene oil are good also, and the expense of applying is but little. Linseed oil is preferable, as it acts to some extent as a wood-filler, filling the pores, and thus aiding the painting which follows in its proper place. Some manufacturers oil all their white-hickory stock before shipping.—*Lumber World.*

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THE *Keynote* says, of Isaac Henderson's intense romance of Italy: "'The Prelate' is one of the most brilliant and fascinating novels of the day — dramatic and powerful, full of thought and rapid in action, and Rome is the picturesque background for it all."

"'THE Prelate' is worthy of high commendations. Here the insight into character, the delicacy and fineness of touch, the keenness of analysis, and the firmness of the literary method, reminds one at times of Mr. Henry James, but are unaccompanied by what the latter's least ardent admirers are wont to call prolixity." — *Christian Union.*

THE *Beacon* commends thus George Willis Cooke's "Poets and Problems: Tennyson, Browning, Ruskin": "Mr. Cooke has given us a helpful, clean and wholesome book, and it will give real aid to the beginner in the highest walks of modern English literature. And Mr. Cooke should be thanked for the simplicity and reverence with which he writes."

THE Rev. Orlando Witherspoon, of Birmingham, Conn., who died last week, was a faithful and hardworking Episcopal minister, famous for his exquisite carols and other church-music, and also as the author of "Doctor Ben," one of the best novels of the famous Round-Robin Series. Some of the Irish characterizations in this most interesting story are equal to anything in the pages of Charles Lever.

THE *Montreal Gazette* gives up a column and a half for a review of Percival Lowell's noble new book about Korea: "His pictures, reproduced with admirable skill and taste, greatly enhance the value of the work. We seem to have Korea and the Coreans, town and country, natural features and architecture, dress and manners, palace and shop, noble and peasant before our eyes, while, from our vantage ground, whatever strikes us as peculiarly strange is promptly relieved of all mystery by the courteous and enlightened *cicerone* who accompanies us."

DR. GEORGE E. ELLIS thus closes a grand and dignified review of the Rev. Samuel Longfellow's biography of Henry Wadsworth Longfellow: "Favored in all conditions of nature and experience as was the honored and beloved Longfellow, the crown of his fame and lasting memorial is found in the privilege of having his chief and only adequate biography prepared by the most congenial spirit of one so near to him in every tie of kinship and spirit. His brother has brought every grace and gift of dignity, taste, and apt method to the preparation of this most welcome work."

"THE subjects are attractive. They are, moreover, discussed with so much enthusiasm and sympathy that readers will be interested as well as attracted. They will find, too, a considerable amount of information pleasantly conveyed." This is the verdict of one of the foremost New-England critics, on George Willis Cooke's "Poets and Problems" (Tennyson, Ruskin, Browning,) published this week by Ticknor & Co.

THE *Pall-Mall Gazette*, on Howells's "Indian Summer":
"There are critics, we are assured, who have entirely made up their minds about Mr. Howells, have docketted him, assigned him his place in literature, and predicted to a nicety his span —no long one — of immortality. For our part we have not yet attained this repose of judgment. On one point only are we absolutely assured — to wit, that if a more masterly novel than "Indian Summer" has appeared in English within the past year we have not had the good fortune to fall in with it."

A WELL-KNOWN critic, in a lengthy review of Morse's "Japanese Homes," in the *Cambridge Tribune* says: "Architects and artists will find material for the exercise of their inventiveness in these chapters on roofs, with the decorative crests, the variety in the eaves, the ornamental arrangement of tiles, the irregular but always tasteful and effective forms of windows.

"In short, this volume is full of suggestions that might, to a certain extent, be carried out to the beautifying, and at the same time simplifying of American houses. The calm and leisure, the gentle ways of our far-off kinsmen of that peculiar country are here as clearly brought out as their refinement and artistic tastes. None but a gentle people could pursue their daily life amidst such fragile and delicate furnishings and finishings; and none but an artistic people would devise and surround themselves with such. The impression left on the reader's mind in closing the book is that we Americans have a great deal to learn; that we are crude and showy; that we do not know what harmony there may be in colors properly used, or the value of soft, neutral tints and of native woods; that we do not know all there is to be known about so simple a thing as hanging a picture or putting flowers in a vase; while, as for decorating, even in a matter so slight as making a sketch on a door-post, we can learn from such cuts as the two marked Fig. 299."

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BUILDING INTELLIGENCE.

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ALTERATIONS.

Baltimore, Md.—Linden & Schoolherr are to build a two-st'y brick addition, 31' x 130', to their store, Lexington St. and Crooked Lane; cost, $10,000; Jas. K. Wilson, architect.

Chicago, Ill.—One-st'y addition to building on East Washington St., by Lieber & Waller, to cost, $6,000; E. Baumann, architect.

New York, N. Y.—Six-st'y brick building factory and warehouse, to be altered internally; costing, $4,000; owner, Thomas McElrath, 23 West One Hundred and Twenty-fourth St.; lessee, Excelsior Steam Power Co.; architects, Wirz & Nichols, 150 Canal St.

Seventh Ave., w s, s w cor. Thirty-ninth St., four-st'y brick dwell., to have an addition, tin roof; cost, $10,000; owner, Jacob Appenheimer, 2206 Second Ave.; architect, Geo. B. Pelham, 56 Wall St.

Fifth Ave., No. 218, five-st'y brick dwell., to be altered for a hotel; cost, $75,000; owner, Richard D. Logerat, 19 East Twenty-eighth St.; architects, Hubert, Pirsson & Co., 19 East Twenty-eighth St.

Third Ave., No. 2162, four-st'y brick store and dwell., to have an extension; cost, $4,000; owner, James Wood, 341 East One Hundred and Sixteenth St.; architect, Julius Munckowitz, 36 Union Sq.

West Twenty-second St., Nos. 23 *to* 27, five-st'y brick store, four-st'y brick extension, with internal alterations; cost, $50,000; owners, Stern Brothers, 34 West Twenty-third St.; architect, Hugo, 234 Broadway.

Broad St., No. 62, four-st'y brick store and office-building, internal alterations; cost, $3,000; owner, Estate C. G. Gunther, Bath Beach, Kings Co.; architect, H. Kreitler, 31 Broadway.

Franklin St., Nos. 108 *and* 110, 2 five-st'y stores, internal alterations; cost, $3,500; owner, Joseph Richardson, cor. Sixth Ave. and Eighty-second St.; architect, Geo. B. Pelham, 56 Wall St.

Walker St., n e cor. Courtland Alley, three-st'y brick manufactory, altered for a manufactory, stores and offices; cost, $3,500; owner, Mrs. A. E. Wood, 46 Park Ave.; architect, Geo. W. Da Cunha, 261 Broadway.

West One Hundred and Twenty-fifth St., No. 72, three-st'y brick dwell., to have an addition, with internal alterations, to cost, $3,500; owner, James L. Perry, 79 West Forty-seventh St.; architect, Geo. Reister, 418 West Fifty-seventh St.

West Twenty-sixth St., 343 *to* 347, 3 four-st'y brick store and dwell., to be raised and have an addition, with internal alterations; cost, $10,000; owner, Jno. L. Hamilton, 346 West Twenty-seventh St.

Eighty-fifth St., n s, 150' w Eleventh Ave., two-st'y and attic brick dwell., to be raised and have an addition; cost, $5,000; owner, Henry Stiers, n s Eighty-fifth St., 150' w Eleventh Ave.; architect, Wm. Graul, 215 Bowery.

Sixth Ave., No. 159, three-st'y brick dwell., addition, with internal alterations; cost, $5,000; owner, George A. Beyer, 205 Second Ave.; architects, J. Boekel & Son, 54 Bond St.

APARTMENT-HOUSES.

Brooklyn, N. Y. — *Rodney St., No.* 110, s s, 100' w Bedford Ave., three-st'y brick flat, tin roof; cost, $7,500; owner, James Delaney, Rush St.; architects and contractors, C. L. Johnson's Sons; mason, Geo. Quinn.

Chicago, Ill. — *Walton Pl.*, three-st'y flats; cost, $6,500; A. Weck, owner; J. Huber, architect.

Shober St., two-st'y flat; cost, $2,500; J. Jenson, owner.

Throop St., two-st'y flats; cost, $2,800; A. Verba, owner.

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Mention this Paper.

BUILDING INTELLIGENCE.

Laflin St., two-st'y flats; cost, $5,000; A. T. Merriman, owner; J. M. Van Osdel, architect.

Butterfield St., two-st'y flats; cost, $3,100; J. J. Donahue, owner.

Holt St., two-st'y flats; cost, $2,500; J. Alfred, owner.

Wentworth Ave., three-st'y flat; cost, $7,800; A. Fraatz, owner; J. F. Doerr, architect.

Shober St., two-st'y flat; cost, $2,500; J. Jenson, owner.

West Taylor St., three-st'y flats; cost, $4,500; J. Levek, owner.

Portland Ave., two-st'y flat; cost, $2,500; G. J. Hastings, Jr., owner.

Wabash Ave., two-st'y flat; cost, $3,900; W. B. Briggs, owner and architect.

Robey St., two-st'y flat; cost, $3,500; Vopicka & Rubin, owners.

Thirteenth Pl., two-st'y flat; cost, $2,800; J. Beifus, owner.

West Jackson St., two-st'y flat; cost, $6,000; O. J. Price, owner; D. S. Pentecost, architect.

New York, N. Y. — *One Hundred and Fifth St.*, s w cor. Tenth Ave., 5 five-st'y brick flats, flat tin roof; cost, $72,000; owners, Hartley & Haigh, 139 East Forty-third St.; architects, D. & J. Jardine, 1262 Broadway.

West Thirty-sixth St., No. 406, five-st'y brick flat, flat tin roof; cost, $20,000; owner, Mrs. Catharine

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Fig. 1. showing the door open, with centre rail level with floor. Fig. 2. Section of sheave, showing its position on rail. Fig. 3. Showing the door closed, with sheave in position and centre rail depressed. Fig. 4. Showing the track running off in the recess.

We claim for this rail all of the following advantages:

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The door cannot get off the track, and runs lightly, smoothly, and noiselessly.

The house does not have to be built for the track, it can be laid in old houses as well as in new.

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Models sent on application.

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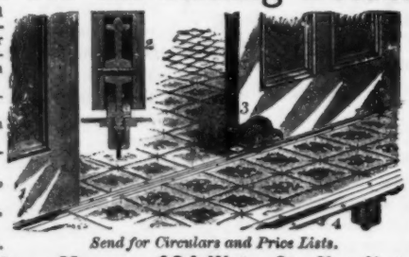

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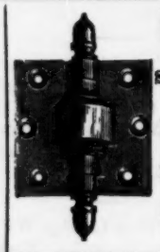

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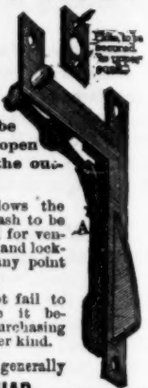

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It allows the upper sash to be dropped for ventilation and locked at any point desired.

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BUILDING INTELLIGENCE.

Cockerill, 350 West Thirty-sixth St.; architect, Bernard McGurk, 244 West Thirtieth St.

Grove St., No. 25, five-st'y brick flat, flat tin roof; cost, $24,000; owner, George Rothman, 10 First Ave.; architect, Berger & Baylies, 52 Bible House.

Twenty-sixth St., s s, 350′ e Tenth Ave., 5 five-st'y brick flats, tin roofs; cost, $100,000; owners, Dunn Bros., 420 West One Hundred and First St.; architects, A. B. Ogden & Son, 1031 Madison Ave.

On Fifty-ninth St., e Ninth Ave., 2 brick and brown-stone flats, 25′ x 89′, are to be built for Mr. James Netter, at a cost of $45,000; from plans of Messrs. A. B. Ogden & Son.

On the s s Thirty-eighth St., bet. Second and Third Aves., 3 five-st'y brick, stone and terra-cotta flats, 20′ x 88′ each, are to be built at a cost of $60,000, for Mr. John D. Karst; from plans of Mr. A. I. Finkle.

At No. 227 East Twenty-eighth St., five-st'y brick and stone flat, 25′ x 85′ is to be built at a cost of $20,000, for Mr. John Fish; from designs of Mr. Richard Berger.

CHURCHES.

Milwaukee, Wis.—The Evangelical Reform Zwingli Association are erecting a $6,000 church, on Thirteenth St.

New York, N. Y.—*Sixty-seventh St.*, n s, 325′ w Tenth Ave., two-st'y brick church and Sunday-school, flat tin roof; cost, $12,000; owner, German Baptist Church, Sixty-seventh St.; architect, Andrew Craig, Post-Office Building, N. Y.

On the s s One Hundred and Sixth St., bet. Fourth and Lexington Aves., the new St. Cecilias Church, 85′ x 125′, is to be built with a front of brick and terra-cotta, at a cost of about $90,000; from plans of Messrs. N. Le Brun & Son.

Taunton, Mass.—The newly-established Presbyterian Church Society has bought a lot on the cor. of Broadway and Washington Sts., upon which a church is soon to be built.

Union Hill, N. J.—The corner-stone of St. Augustine's Roman Catholic Church, of which the Rev. A. M. Brady is pastor, will be laid by Bishop Wigger, of Newark, on Easter Sunday, April 25.

FACTORIES.

Chicago, Ill.—Five-st'y factory, for Fergus Printing Co., Dearborn Ave.; cost, $8,000; G. Vigeant, architect.

Philadelphia, Pa.—*Fourth St.*, n w cor. Cambria St., brick factory, 46′ x 171′; owner, John W. Anderson, 1321 South Eighteenth St.

HOTELS.

Chattanooga, Tenn.—A five-st'y hotel, to cost $50,000, will be built here by Peebles Bros.

Richmond, Va.—A three-st'y hotel will be built here by John Murphy, Esq.

HOUSES.

Chicago, Ill.—*Prairie Ave.*, two-st'y dwell.; cost, $4,500; I. S. Smith, owner; H. R. Wilson, architect.

BUILDING INTELLIGENCE.

Washington Boul., two-st'y dwell.; cost, $4,500; Mrs. Stewart, owner.

Loomis St., two-st'y dwell.; cost, $2,500; D. F. Bremner, owner; G. Vigeant, architect.

Austin Ave., three st'y dwell.; cost, $4,000; Mary A. Crane, owner.

Grand Boulevard, two-st'y dwell.; cost, $7,000; J. McCormick, owner; C. E. Kaufmann, architect.

West Thirteenth St., two-st'y dwell., cost, $4,000; L. Tiernan, owner; C. W. Narkene, architect.

Evergreen St., two-st'y dwell.; cost, $6,500; J. Ott, owner; H. Sierks, architect.

Monroe St., two-st'y dwell.; cost, $3,500; S. L. Wood, owner.

Warren Ave., two-st'y dwell.; cost, $3,200; Mrs. S. McErving, owner; W. H. Thomas, architect.

Sibley St., two-st'y dwell.; cost, $4,500; A. L. Bergeron, owner; G. Vigeant, architect.

West Twelfth St., three-st'y dwell.; cost, $5,000; G. Gegenwarth, owner.

Fowler St., two-st'y dwell.; cost, $4,000; A. Johnson, owner; C. E. Lehmann, architect.

Vernon Ave., 3 two-st'y dwells.; cost, $12,000; W. Manson, owner; Addison, architect.

Wilcox Ave., 4 two-st'y dwells.; cost, $8,000; C. Barker, owner and architect.

Larchmont, N. Y.—A $5,000 cottage is to be built for Mrs. A. T. Curtenius; W. H. Smith of New York, architect.

Memphis, Tenn.—Otto Zimmerman, Broadway and Mississippi Ave., two-st'y house; cost, $3,000.

Minneapolis, Minn.—P. Barstow, two-st'y frame dwell., 645 North Penn Ave.; cost, $4,800.

C. H. Bradbury, 2 two-st'y frame dwells., 2833-2839 Harriet Ave.; cost, $6,000.

C. H. Bradbury, two-st'y frame dwell., 2909 Garfield Ave.; cost, $3,000.

S. G. Myers, two-st'y frame dwell., 1714 Eighth Ave., s; cost, $5,500.

I. H. Edmunds, two-st'y frame dwell., 523 West Nineteenth St.; cost, $3,500.

E. D. Titus, double frame dwell., 3112 and 3114 Pleasant Ave.; cost, $5,000.

O. Mordell, two-st'y frame dwell., 1106 Pleasant Ave.; cost, $3,000.

O. Mordell, two-st'y frame dwell., 2510 Stevens Ave.; cost, $3,500.

L. I. Smith, two-st'y frame dwell., 3117 Grand Ave.; cost, $3,500.

L. W. Ellwood, 2 two-st'y frame dwells., 122-126 West Twenty-eighth St.; cost, $6,000.

S. N. Campbell, 5 two-st'y frame dwells., 716, 720 and 724 South Tenth St.; cost, $7,500.

J. Dohn, two-st'y frame dwell., 1810 Mt. Curve Ave.; cost, $4,000.

J. H. Jones, two-st'y frame dwell., 3140 Third Ave., s; cost, $4,000.

W. J. Gruber, two-st'y frame dwell., 1423-1427 Adams St., n e; cost, $3,500.

G. W. Morong, two-st'y frame dwell., 17 East Twenty-seventh St.; cost, $4,500.

BUILDING INTELLIGENCE.

Mrs. E. J. Harford, double two-st'y frame dwell., 709 and 711 Seventh Ave.; cost, $6,000.

A. Barnard, two-st'y frame dwell., 300 Hawthorne Ave.; cost, $5,000.

New York, N. Y.—*One Hundred and Thirty-first St.*, s s, 300′ e Seventh Ave., 3 three-st'y brick dwells., tin roofs; cost, $30,000; owner, Ethelbert Wilson, 267 West One Hundred and Twenty-sixth St.; architect, I. T. Miller, 247 One Hundred and Twenty-fifth St.

One Hundred and Thirty-second St., s s, 50′ w of Sixth Ave., 3 three-st'y brick dwells., tin roofs; cost, $30,000; owner, Samuel O. Wright, 101 West One Hundred and Thirty-first St.; architects, Cleverdon & Putzel, 110 East One Hundred and Twenty-fifth St.

Eighty-fourth St., n s, 98′ w Ave. B, five-st'y brick dwell., tin roof; cost, $14,000; owners, G. & J. Schneider, 295 Mott St.; architect, John Brandt, 1491 Third Ave.

Eleventh Ave., e s, 80′ 5″ s of Seventy-first St., three-st'y dwell., tin roof; cost, $16,000; owners, Fonner & Lowther, 149 Broadway; architect, E. L. Angell, 137 Broadway.

Morris Lane, n s, 225′ e Sedgwick Ave., two-st'y stone and wooden dwell., shingle roof; cost, $7,000; owner, Elizabeth D. Camp, Fordham Heights; builders, C. V. Folin & Son, Fordham.

One Hundred and Twenty-third St., n s, n e cor. Ninth Ave., 6 five-st'y brick dwells., tin roofs; cost, $90,000; owner, Mary E. Bailey, One Hundred and Fourth St. and Third Ave.; architect, Chas. Baxter, 112 East One Hundred and Twenty-fifth St.

Philadelphia, Pa.—*Mercer St.*, e s, bet. Ashmead and Jefferson Sts., 10 two-st'y dwells., 14′ x 28′; owner, William Garoin, 5008 Adams St.

Chelton Ave., n s, near Chew St., 2 three-st'y dwells., 19′ x 47′; owner, William Garoin, 5008 Adams St.

Ashmead St., s s, bet. Mercer St. and the Railroad; 6 two-st'y dwells., 16′ x 42′; owner, William Garoin, 5008 Adams St.

Allsworth St., n s, bet. Thirteenth and Fourteenth Sts., 2 three-st'y dwells., 16′ x 55′; owner, John Gibson, 1323 Reed St.

Wharton St., n s, bet. Thirty-second and Thirty-third Sts., 7 two-st'y brick dwells., 15′ x 40′; owner, James Kerns, 519 South St.

K St., s s, bet. Kensington Ave. and Venango St., two-st'y brick and stone dwell., 16′ x 40′; owner, D. C. Schuler, 2263 Fairhill St.

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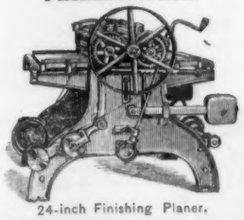

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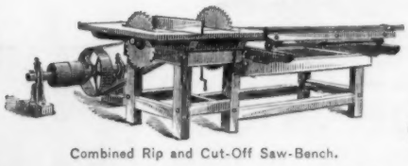

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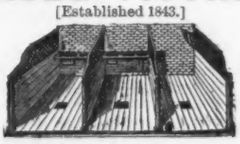

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CITY ENGINEER'S OFFICE, CITY HALL,

PROVIDENCE, R. I., March 12, 1886.

Abstract from letter of

SAMUEL M. GRAY, CITY ENGINEER.

During the season of 1885 the **Sewer Department** used **3,152 Barrels** of the **New York and Rosendale Cement.** Of this amount **1,348** barrels were tested for tensile strength, the average of the Season's tests being **165.7** pounds per square inch, twenty-four hours test.

One hundred and forty-five barrels were tested for fineness, the average amount passing through a **2,500** mesh sieve being **92.56** per cent.

Tests for checking were occasionally made but none were discovered.

BUILDING INTELLIGENCE.

LABOR.

Haverhill, Mass. — The plasterers have had their pay advanced from $3 to $3.50 per day.

Malden, Mass.—Mr. J. E. Stanwood, who intended to build a large business block near the central railroad station, has decided to postpone the carrying out of the plan, owing to the dissatisfaction expressed by the carpenters in the city with their present pay.

Milwaukee, Wis. — All the boss carpenters in the city belonging to the Builders' Association have now been notified by their men that, commencing May 1, they will be expected to pay ten hours' wages for eight hours' work. An answer is demanded by Saturday of this week.

New Haven, Conn. — The request of the Painters' Union that nine hours constitute a day's work, at the same pay as now paid for ten hours, has been granted by nearly every shop in town, and will go into effect at once.

Providence, R. I. — The Providence Union of Carpenters and Joiners have passed resolutions demanding that fifty-three hours shall constitute a week's work after May 15, with no change of wages.

Wakefield, Mass.—The Knights of Labor of Wakefield have appointed a committee to prepare a price list for the Smith & Anthony Stove Foundry. The firm employs about sixty moulders, and they want an increase of ten per cent. The company has refused to grant their request. If the company refuse to agree on a price list with the Knights of Labor Committee, active measures will be taken.

OFFICE-BUILDINGS.

Chicago, Ill. — *Twenty-second St.*, two-st'y office-building, for M. Schmidt; cost, $2,500; J. Doer, architect.

New York, N. Y.—Messrs. Leopold & Cyrus Eidlitz are drawing the plans for the eight-st'y office-building, 72′ x 125′, to be erected for the Metropolitan Telephone and Telegraph Co., at Nos. 16-20 Courtlandt St.

PUBLIC BUILDINGS.

Nashville, Tenn. — A new court-house is to be built here. S. P. Younce has the contract.

RAILROAD BUILDINGS.

Brainerd, Minn. — A. Bjurquist, of Moorhead, has secured the contract for the stone and brick work on the Northern Pacific shops.

Bristol, Conn. — The New York & New England Railroad will build a new depot here, if a suitable site can be obtained.

Grand Rapids, Mich. — The Grand Rapids & Indiana R. R. Co. intends to build new shops here.

Jersey City, N. J.—The New York, Lake Erie, and Western Railroad, Company proposes to erect a handsome iron structure, 600′ long and 140′ wide. The preliminary work was begun on Saturday last, when the telegraph wires were removed from the roof to poles in the avenue.

New London, Conn. — A railroad depot for the Northern Railroad, 40′ x 150′, with platforms of between 400 and 500 feet in length, is to be built.

New York, N. Y. — A brick and stone freight depot about 100′ x 130′, is to be erected for the Adams Express Co., at the s w cor. Fourth Ave. and Nineteenth St.; from designs of Mr. Thos. R. Jackson.

Ravenna, O. — The officers of the C. & P. R. R., J. N. McCullough, President, Pittsburgh, Pa., will probably build a new depot.

Sodus Point, N. Y.—The Northern Central R. R. Co. will build a depot and put $10,000 in improvements in real estate there. General Agent Melfin, Williamsport, Pa.

BUILDING INTELLIGENCE.

Steubenville, O.—The Cleveland & Pittsburgh, and Pittsburgh, Cincinnati & St. Louis Railroads will build a large union station at once.

Taunton, Mass.—Work has been commenced on enlarging the Old Colony round-house.

SCHOOL-HOUSES.

Waterville, O.—E. O. Fallis & Co., architects, of Toledo, have in hand drawings for a brick college building for the Ursuline Sisters; cost, $45,000.

STABLES.

Philadelphia, Pa. — *Redwood St., No.* 518, one-st'y brick stable, 12′ x 16′; owner, Geo. Lodge, s w cor. Third and Federal Sts.

Watkins St., s s, w Tenth St., two-st'y brick stable, 16′ x 80′; owner, Patrick A. Moran, s w cor. Tenth and Watkins Sts.

Germantown Ave., No. 4098, brick stable, 15′ x 25′; owner, Jos. B. Minnick, 4098 Germantown Ave.

STORES.

Aurora, Ill. — Brick and stone store and flat building; cost, $11,000; owner, Ralston Bros.; architect, F. Baumann, of Chicago, Ill.

Chicago, Ill. — *West Twelfth St.*, three-st'y store; cost, $9,000; J. Schaub, owner; P. W. Ruehl, architect.

West Twelfth St., three-st'y store; cost, $6,000; T. McCormick, owner; Zarabel, architect.

Ogden Ave., two-st'y store; cost, $3,500; J. H. Braynard, owner; W. Shipman, architect.

Twenty-second St., three-st'y store; cost, $7,000; F. Schneider, owner; C. W. Warneki, architect.

North Ave., three-st'y store; cost, $7,000; William Krause, owner; Riegert, architect.

Twenty-second St., three-st'y store; cost, $14,000; J. Pauly, owner.

Ogden Ave., three-st'y store; cost, $14,000; W. P. Fritz, owner; P. Rae, architect.

Wentworth Ave., 2 three-st'y stores; cost, $18,000; F. Homan, owner; J. Doerr, architect.

Wentworth Ave., three-st'y store; cost, $7,000; J. Aye, owner; J. Doerr, architect.

Wentworth Ave., three-st'y store; cost, $7,000; Mrs. E. Budinger, owner; J. Doerr, architect.

Clark St., two-st'y store; cost, $6,000; H. Brockhaus, owner; T. Karls, architect.

Columbus, O.—Kinnear & Foster will build a building for storerooms and offices, at a cost of $30,000.

N. P. Huntington and Wm. G. Dishler intend to build a business block, cor. High and Chestnut Sts., at a cost of $50,000.

Memphis, Tenn.—L. Lucarini, cor. Gayoso and Hernando Sts., two-st'y brick store; cost, $2,550.

Millersburg, O. — B. S. Young will build two-st'y brick store-building, 33′ x 60′; cost, about $4,000; architect, H. W. Mason, of Fort Wayne, Ind.

New York, N. Y. — *Centre St.*, s e cor. Worth St., five-st'y brick store, flat tin roof; cost, $50,000; owner, Ambrose C. Kingsland, 55 Broadway; architect, Geo. W. Da Cunha, 261 Broadway.

Philadelphia, Pa. — *Carpenter St., No.* 911, two-st'y brick store, 10′ x 22′; James Park, owner, n w cor. Ninth and Carpenter Sts.

San Francisco, Cal.—One-st'y frame store, cost, $3,980; owner, W. J. Houston; architect, C. I. Haven.

Brick and stone store building; cost, $90,000; owner, A. M. Davis; architects, Copeland & Banks.

TENEMENT-HOUSES.

New York, N. Y. — *One Hundred and Thirtieth St.*, n s, 250′ e Eighth Ave., 4 three-st'y and basement brick tenements, flat tin roof; cost, $48,000; owner, Stephen J. Wright, 201 West One Hundred and Thirtieth St.; architects, Cleverdon & Putzell, 110 East One Hundred and Twenty-fifth St.

BUILDING INTELLIGENCE.

One Hundred and Twenty-second St., s e cor. Lexington Ave, five-st'y brick tenements, tin roof; cost, $38,000; owner, Charles E. Hall, 209 East Forty-eighth St.; architects, Thom & Wilson, 1267 Broadway.

Sixty-ninth St., n s, 263′ e First Ave., 3 five-st'y brick tenements, flat tin roof; cost, $45,000; owner, Frame & McGirr, 214 East Seventieth St., architect, G. A. Schellinger, 128 Broadway.

Division St., cor. Canal No. 143, five-st'y brick tenement, flat tin roof; cost, $12,000; owner, Henry B. Mount, 359 Pearl St.; architect, Fred'k Jenth, 191 Forsyth St.

Seventy-third St., s s, 114′ e First Ave., 3 five-st'y brick tenements, tin roof; cost, $13,000; owner, Frederick Niemeier, 1666 Second Ave.; architects, Cleverdon & Putzell, 110 East One Hundred and Twenty-fifth St.

Seventh St., s s, 68′ w Second Ave., five-st'y brick tenement, flat tin roof; cost, $12,000; owner, Jacob H. Miller, 115 Second Ave.; architect, Julius Kastner, 744 Broadway.

East Broadway, No. 29, five-st'y brick tenement, flat tin roof; cost, $15,000; owner, Morris Alexander, 97 East Broadway; architect, Frederick Ebeling, 140 Second St.

Hester St., No. 19, five-st'y brick tenement, tin roof; cost, $15,000; owners, Gootman & Zubrinsky, 25 East Broadway; architect, Charles Rentz, 153 Fourth Ave.

Pike St., No. 17, five-st'y brick tenement, flat tin roof; cost, $18,000; owner, Harris Rosenthal, 17 Pike St.; architect, Thos. P. Dunne, 231 West Fiftieth St.

One Hundred and Thirteenth St., n s, 143′ w Avenue A, five-st'y brick tenement, flat tin roof; cost, $12,000; owner, Michael Reilly, 1976 Fourth Ave.; architects, N. Le Brun & Son, 24 Park Pl.

Tenth Ave., e s, 24′ 8″ s Twenty-seventh St., five-st'y brick tenement, flat tin roof; cost, $15,000; owner, Mrs. J. S. Sherman, 154 West Fourteenth St.; architect, G. A. Schellinger, 128 Broadway.

Seventh St., s s, 68′ 10″ w Second Ave., five-st'y brick tenement, tin roof; cost, $12,000; owner, Jacob H. Miller, 115 Second Ave.; architect, Julius Kastner, 744 Broadway.

Washington Ave., No. 1110, three-st'y brick tenement, flat tin roof; cost, $8,000; owner, Charlotte R. Hanlon, 1108 Washington Ave.; architect, W. W. Gardiner, 1364 Washington Ave.

One Hundred and Forty-third St., n s, 100′ w from Eighth Ave., five-st'y brick tenement, flat tin roof; cost, $11,000; owner, John Donnellan, 589 West One Hundred and Forty-fifth St.; architect, B. W. Warner, 132 Broadway.

One Hundred and Forty-third St., n w cor. Eighth Ave., 3 five-st'y brick tenements, flat tin roofs; cost, $11,000; owner, John Donnellan, 489 West One Hundred and Forty-fifth St.; architects, B. W. Warner, 132 Broadway.

THEATRES.

Braddock, Pa. — H. M. Lythe, proprietor of the Opera-House at this place, will extend the building to the cor. of John St., putting in steam heat, etc., at a cost of $25,000.

Chester, Pa. — Chester, Pa., is to have a new opera-house. Eighty thousand dollars in bonds are to be issued and sold, of which $30,000 is to be used to purchase land, and $50,000 to erect the building.

WAREHOUSES.

Baltimore, Md. — A five-st'y warehouse is to be erected on the s s German St., between Hanover and Sharp Sts., by Andrew B. McCreery, Esq.

Minneapolis, Minn. — Woolf & McCormick, five-st'y brick warehouse, 250-8 Third Ave., n; cost, $60,000.

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BUILDING INTELLIGENCE.

Providence, R. I.—Wood storehouse, Canal St., w s; owner, A. B. McCrillis.

Philadelphia, Pa. — *Wharton St.*, n s, between Fifteenth and Sixteenth Sts., two-st'y brick storage-house, 28′ x 58′; owner, Alexander Beck, 1234 South Fifteenth St.

MISCELLANEOUS.

Boston, Mass. — The Boston Gaslight Company is building another gas-holder at the Commercial Point Works. This holder will have a capacity of about 1,500,000 feet. Two others of the same size are to be erected in a short time, making four holders, with a capacity of about 6,000,000 cubic feet.

New York, N. Y. — *Forty-first St.*, n s, 390′ e First Ave., three-st'y brick pump-tank house, peak slate roof; cost, $8,500; owner, Equitable G. L. Co., 340 Third Ave.; architect, A. W. Putnam Cramer, cor. Fortieth St. and Third Ave.

The following officials for the Building Material Exchange have been elected: President, Melzar P. Dunbar; Vice President, Charles S. Shultz; Treasurer, Edwin D. Knapp; Trustees, Melzar P. Dunbar, Charles S. Shultz, Edwin D. Knapp, Joseph R. Van Valen, Henry R. Brigham, Emil Thiele, Frank E. Wise, Frederic W. Robinson, Hans S. Christian, Noah Furman, Edwin Terry, Samuel L. Keene, John J. Bell; Inspectors of Election, Isaac E. Hoagland, William V. Burroughs, P. G. Hughes.

One Hundred and Twenty-fifth St., n s, 64′ w Eighth Ave., two-st'y brick warehouse, flat tin roof; cost, $7,500; owner, Michael Adrion, 330 Bowery; architects, I. Bockell & Son, 54 Bond St.

BIDS AND CONTRACTS.

New York, N. Y.—The Fire Commissioners have awarded James Duffy the contract for finishing in oak the upper part of the building for their new headquarters in East Sixty-seventh St., the amount being $36,729. They have also given the contract for the steam-heating apparatus to John Neal's Sons for $6,900.

Norfolk, Va.—The following were the proposals for water-closets at the Naval Hospital: —

Alexander & Powell, Portsmouth, Va., $450; Geo. L. Neville, Portsmouth, Va., $478.50; J. L. Mott Iron Works, New York City, $478.50. The J. L. Mott Iron Works have been awarded the contract.

COMPETITION.

KANSAS CITY EXCHANGE.

[At Kansas City, Mo.]

Kansas City, Mo., March 31, 1886.

The Exchange Building Association of Kansas City are proposing to erect a building to cost not more than 400,000 dollars. They have specially invited several architects to furnish designs in competition, but will also receive and consider designs by other architects not so invited. The drawings are to be in line, and are to be made to a scale of one-sixteenth of an inch to the foot, and are to be delivered **on or before the 15th of June next,** at Columbia College in the city of New York, to the care of Prof. William R. Ware, whom the Association have appointed to be their professional adviser.

Printed instructions will be furnished on application to the editors of the *American Architect and Building News*, or to the undersigned.

EDWARD H. ALLEN,
President of the Exchange Building Association.
539

PROPOSALS.

IRON WATER-PIPE.

[At Easton, Md.]

Sealed proposals, addressed to the undersigned, will be received **until 2 o'clock,** P. M., **Wednesday, April 28, 1886,** for the construction of Water Works at Easton, Md., including furnishing cast-iron pipe, special castings, stop valves, fire hydrants, etc., and laying and setting the same. Also for steam-pumping machinery, stand-pipe and engine-house.

Drawings may be seen, and specifications obtained at the office of Wm. E. Shannahan, Secretary, Easton, Md., or at the office of Isaac S. Cassin, Engineer, Germantown Ave. and Second St., Philadelphia, Pa.

WM. E. SHANNAHAN, Secretary,
539 Easton Water Co., Easton, Md.

WATER-WORKS.

[At Little Falls, N. Y.]

Sealed proposals will be received at the office of the Board of Water Commissioners of Little Falls, N. Y., **until Thursday, May 6, 1886, at 3** P. M.

1. For constructing Beaver Creek conduit, dam and inlet chamber. Conduit about eight miles long. Amount of deposit required, $500.

2. For constructing distribution reservoir and about one mile of open canals. Amount of deposit required, $500.

3. For excavating and refilling trenches and laying the system of distribution complete, about sixteen miles. Amount of deposit required, $500.

4. For the valves and hydrants required for the system complete.

Four separate contracts in all.

The blank forms, specifications, and all other information will be ready on and after April 16, 1886. Application for the same to be made to Stephen E. Babcock, chief engineer, Little Falls, N. Y.

The Water Commissioners reserve the right to reject any or all bids. C. J. PALMER,
540* Secretary.

PINE, TIN, ETC.

[At Washington, D. C.]

U. S. Navy Pay Office,
Washington, D. C., April 12, 1886.

Sealed proposals, in duplicate, endorsed "Proposals Ordnance," will be received at this office **until noon, May 10, 1886,** for articles required as follows, to be delivered at the Ordnance Department of the Navy-Yard, Washington, D. C., free of any expense to the Government, and subject to the usual inspection and conditions, viz.: Requisition No. 206, white pine; No. 210, Lake Superior Copper Straits tin.

Proposals must be made on official forms furnished (with schedules giving details) by this office. For expert and other information apply to navy-yard.

The right is reserved to reject any or all bids, and bids only from "manufacturers of, or regular dealers in, the articles which they offer to supply," will be considered.

Responsible persons must guarantee the prompt and faithful execution of contract, and the competency of the guarantors must be certified to before a United States officer. THOS. H. LOOKER,
Pay Director U. S. Navy.
541 Navy Pay Agent.

ARMY BUILDINGS.

[At Fort Niagara, N. Y.]

Office of Chief Quartermaster,
Department of the East,
Governor's Island, N. Y., April 12, 1886.

Sealed proposals, in triplicate, subject to the usual conditions, will be received at this office and the office of the Quartermaster at Fort Niagara, N. Y. **until 12 o'clock,** M. (eastern time), **April 26, 1886,** at which time and places they will be opened in the presence of bidders, for the construction of one range building and one officers' lodge, both of frame, in accordance with plans and specifications which can be seen at this office, office of the Post Quartermaster at Fort Niagara, N. Y., and Depot Quartermaster's Office, Buffalo, N. Y.

Blanks for proposals and information as to the manner of bidding, etc., can be obtained at the offices mentioned. Envelopes containing proposals should be marked "Proposals for Construction of Range Buildings at Fort Niagara, N. Y."

The Government reserves the right to reject any or all bids. ALEX. J. PERRY,
539 Asst. Q. M. Gen'l, U. S. Army.

PROPOSALS.

IRON ROOFS, ETC.

[At Baltimore, Md.

Office of Supervising Architect,
Treasury Department.
Washington, D. C., April 6, 1886.

Sealed proposals will be received at this office **until 2** P. M., **on the 30th day of April, 1886,** to furnish and put in place, complete, the iron main and court roof framing, etc., of the post-office and court-house building, at Baltimore, Md., in accordance with drawings and specification, copies of which and any additional information may be had on application at this office, or the office of the superintendent.

Bids must be accompanied by a certified check for $2,000. M. E. BELL,
539 Supervising Architect.

EXHIBITION-BUILDING.

[At Columbus, O.]

State-House, Columbus, O., April 15, 1886.

Sealed proposals for the erection of main exposition building on the new State Fair Grounds, Columbus, O., will be received at our office **until noon of May 4.** Proposals must be submitted on schedule blanks furnished by the Board.

Plans and specifications may be seen at the office of Terrell & Morris, architects, No. 45 North High St., Columbus, O., after Tuesday, April 23.

A satisfactory guarantee must accompany each bid that a contract will be entered into if the bid is accepted.

The Board reserves the right to reject any or all proposals, or to accept any part of any proposal.
540 Ohio State Board of Agriculture.

BRIDGE.

[Over Harlem River, N. Y.]

Sealed proposals will be received by the Harlem River Bridge Commissioners, at their office, Room 73, Cotton Exchange Building, Hanover Square, New York City, **until 12** M., **on the 22d of April next,** for the construction of the proposed bridge over the Harlem River at One Hundred and Eighty-first St.

Plans, specifications and forms of proposal can be had at the Commissioners' office on and after Monday, March 22.

For full information see *City Record*, for sale at No. 2 City-Hall. 539

SEWER.

[At Lynn, Mass.]

City Engineer's Office,
City of Lynn, Mass.

Sealed proposals will be received by the Committee on Drainage **until 12 o'clock,** M., **of Monday, April 26, 1886,** for completing Section 2 of the eastern intercepting sewer in Lynn, Mass. Each bid must be accompanied by a bond of $2,000, conditioned for the execution of the contract. The amount of bond for performance of the contract will be $25,000, and the sureties must be residents of Massachusetts. Specifications may be obtained and plans may be examined at the office of the City Engineer, City-Hall, Lynn.

The committee reserve the right to reject any or all bids, should it deem it to be for the interest of the city so to do. CHARLES R. SMITH,
Chairman of Joint Standing Committee on Drainage.
539

JETTY.

[At Presqu'ile, Pa.]

Office of U. S. Light-House Engineer,
Tenth District,
Detroit, Mich., April 5, 1886.

Sealed proposals will be received at this office **until 2.30 o'clock,** P. M., **on the 5th day of May, 1886,** for furnishing the material and labor for building a jetty, 400 feet in length, of stone-filled cribs, for the protection of the shore in front of the Presqu'ile, Pa., light station.

For forms, specifications and all information apply to this office.

The right is reserved to reject any or all bids, and to waive any defects.

CHAS. E. L. B. DAVIS,
Captain of Engineers, U. S. Army,
540 Engineer Tenth Light-House District

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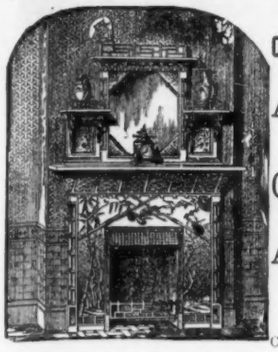

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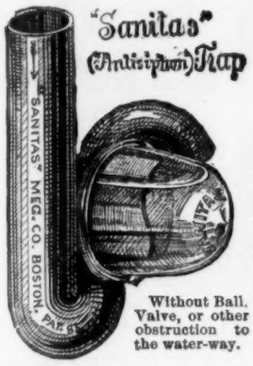

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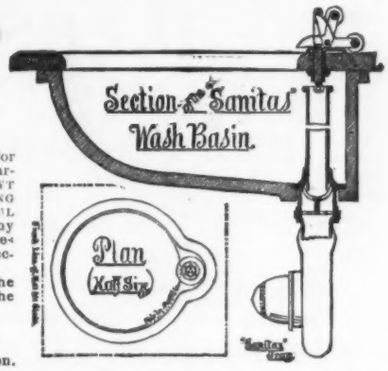

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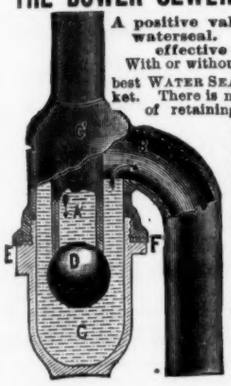

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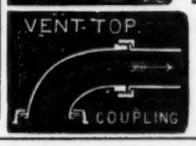

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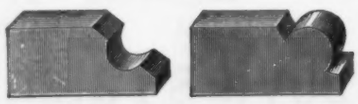

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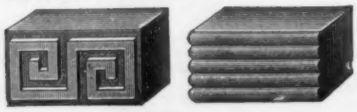

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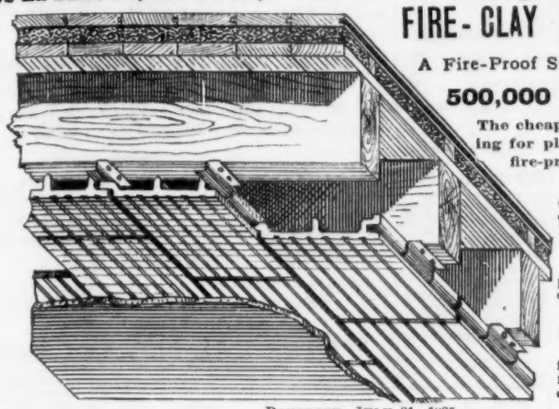

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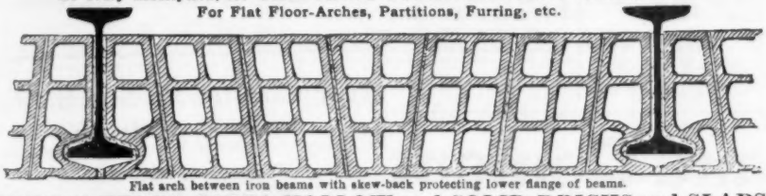

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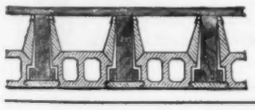

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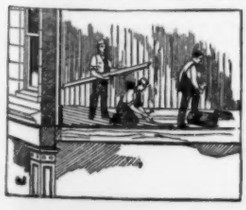

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